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A Magazine of Western Ornithology

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COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

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THE CONDOR

VOLUME XXXIX SEPTEMBER-OCTOBER, 1937 NUMBER 5

NESTING OF THE SAW-WHET OWL

WITH ONE ILLUSTRATION

By WILLIAM M. GRANFIELD

Early last fall a companion and I put up a number of boxes for Screech Owls in the vicinity of the southern end of the Spring Valley Lakes in San Mateo County, California. One "house" in particular was set up about twenty feet from the ground in a coast live oak, situated in a narrow belt of trees among madrones, valley oaks and chaparral between two large meadows. These meadows are bordered on the south and west by heavily forested hills and on the north and northeast by the southernmost of the Spring Valley Lakes. The house itself is about two hundred yards from the southern shore of the lake. During the winter and early spring we visited this house only twice and, both times, noticed that the box was occasionally being used as a roosting place by an owl.

Then came the surprise. On April 18, 1937, after having inspected our other owl houses, we approached the box in the tree. Because of the noise we made rustling the dead oak leaves, an inquisitive, brown-streaked head was thrust from the opening of the box. It was a Saw-whet Owl (*Cryptoglaux acadica*)! The head remained in the doorway and regarded us sleepily though in a somewhat surprised manner. But when we climbed the tree, to find six creamy white eggs in the box, the owl immediately flew in great alarm into a nearby lichen-laden oak.

The eggs were lying in a circle on a bed of sawdust and pellets approximately in the center of the box, and there was no evidence of any prey having yet been brought to the nest. Fear of causing the bird to desert the eggs made us immediately retreat from the vicinity without further examination.

The following Sunday, April 25, we revisited the box in the oak, armed with camera and flashlight bulbs; but this time the sleepy-headed owl did not appear at the opening. Even when we climbed to the box there was no audible activity inside, but when we raised the roof we discovered the owl brooding the eggs. During the time it took us to take flashlight pictures, she sat immobile and stared at us fixedly. In the box with her this time was a dead field mouse, probably a result of the previous night's foraging.

On May 2, the female (supposedly this sex) again chose to remain on the eggs and did not appear at the entrance. Having had little previous experience with nesting owls, we did not disturb her, so were unable to learn whether the eggs had hatched.

As a result of the rising of the Spring Valley Lakes, the house was inaccessible to us the following week-end; but on the succeeding Saturday, May 15, through the aid of the district patrolman (the Spring Valley Lakes lie in a state game refuge), Mr. Percie Bee, we reached the owl box. The saw-whet evidently knew of our approach and was peering out of the entrance when we arrived. We were able to ascend to within six feet of the box and snap her picture before she left the nest, reluctantly, to fly into an adjacent oak. In the box were four sleepy babies, about two weeks old, and two

discolored, infertile eggs, surrounded by the remains of a number of field mice and the upper portion of a rat.

When we switched on a flashlight, the mother owl uttered the whistle peculiar to the saw-whet, which resembles the sound made by filing or whetting a saw, and flew

Fig. 54. Young Saw-whet Owl photographed June 5, 1937, near nest site in San Mateo County, California.

back into the nest-box tree about seven feet from us. While we examined the babies, she nervously stared at us, occasionally blinking and surveying the surrounding territory, acting as if she intended to approach closer. Having satisfied our curiosity we departed and left the owl family to itself.

On our succeeding visit, May 18, my companion, Dick Santee, banded the mother in the box and each of the babies. Returning the following Sunday, May 24, to obtain photographs, we found the mother absent from the nest and the babies well feathered. The box emitted the unpleasant odor of dead mice and regurgitated pellets.

As our last visit, June 5, was beyond doubt one of the babies' few remaining days in the nest, we decided to take them down from the box and photograph them in the open. It was then obvious that the baby owls had the "Kirtland" plumage, the seldom-seen evanescent juvenile plumage of the Saw-whet, which is believed to have been photographed but rarely before (Bird-Lore, vol. 39, 1937, p. 141); the mother owl, the only parent observed, had the common saw-whet plumage.

We lowered the apparently docile owlets in a knapsack and set them on a low oak branch in the open. We intended to take a family picture, but in the end we had to be content with a group picture of only three, because when we succeeded in placing the four owls on the branch, they would either claw and scratch each other, or one or two would spread their wings and drop off. During one attempt two of the babies took to their wings and succeeded in flying over fifty feet before being caught and brought back.

When we returned them to the box, they continued to fight among themselves, acting as if they were total strangers, and one of them continually attempted to escape through the opening. When we used a flashlight bulb, while taking a final picture, they huddled in a corner and evidently remained so until one appeared at the entrance and intently watched us depart.

1125 Cortez Avenue, Burlingame, California, June 23, 1937.

WINTER HABITS OF THE WHITE-THROATED SWIFT

By Gayle Pickwell

Alum Rock Canyon, a city park of San Jose, Santa Clara County, California, is a comparatively deep, east-west canyon in the foothill region of the Mount Hamilton range about six miles to the east of the city. Certain portions of the upper canyon, on the south and west-facing slopes, are composed of precipitous rock faces. These rock faces lie immediately above the Sycamore Canyon Road which follows the north wall of the canyon some two or three hundred feet above the canyon's bottom. In the vicinity of these rocks, White-throated Swifts (*Aëronautes saxatalis*) have frequently been observed, and in the crevices the swifts have nested. Only during the past few months, however, have observations of some care been made in connection with the wintering habits of these birds in this area.

On one occasion, as long ago as November 21, 1931, White-throated Swifts, some two or three score in number, were noted entering and leaving a fissure in the rock faces above the Sycamore Canyon Road. These observations were made about 3:30 p.m. Not again until the late summer of 1936, and the winter just past, were further observations made. During this period, visits were made as follows: August 3 and 21, September 12, October 24, and November 15, all in 1936; March 6, and April 4, in 1937. Mr. Henri Hill kindly furnished reports for November 29, 1936, and January 9, 1937. Mr. James Peterson made a report concerning the swifts on January 23, 1937.

The niche in which the swifts quartered themselves in 1931, and throughout the observations here reported upon, consists of a recess of unknown depth extending beneath a rock face that lies at an angle a little short of the vertical. It is about fifteen feet immediately above Sycamore Canyon Road. The crevice through which the swifts enter and leave measures, it is estimated, from two to three inches in width and about two and one-half feet in length. All of the swifts noted, during the dates specified, used this aperture and this one only.

On August 3, the swifts were flying about in the canyon when first observed just at sunset. A crude estimate made of their numbers in the air gave from one hundred to two hundred individuals. Prior to entering the night roost the birds streamed in a procession into the shadows by it and then turned out into the light of the canyon. Shortly thereafter they entered the rock, streaming in with unbelievable rapidity. Three or four struck the crevice simultaneously, and now and then they struck one another. Twenty or more entered in an interval of one or two seconds. The entire flock was housed between 7:20 and 7:25 p.m., and a constant chattering thenceforth welled from the rock face. The sun had set some time previously, and deep shadows filled the gorge of the canyon.

The region was visited too late (6:55 p.m.) on August 21 to observe the swifts entering their nightly abode, but their voices came in volume from the rocks. The

observations of September 21 were similar to those of August 3. On this date our group of observers, adults and children, were on the road immediately beneath the entrance into the roosting place, but the swifts, nevertheless, streamed past, between us and the rock and therefore only a few feet away. This continued for approximately ten minutes before the first swift whizzed into the entry at 6:30 p.m. In exactly two minutes after the first entered, the last was in, at 6:32. The count, which could have been in error only to the extent of two or three individuals, was 49. The birds maintained the usual chattering after having entered the rock.

The observations of October 24 differed from the earlier ones in that no swifts were observed in the canyon until 5:31 p.m., when two flew into the roosting quarters. Promptly at 5:35, and within a space of ten seconds thereafter, the mass of the swifts poured into the rock. They had dropped abruptly from parts unknown. The birds went into the roosting niche as fast as shot poured through a funnel; faster than the tongue could waggle in an attempt to count. Only one individual missed the aperture, dropped away, and tried again with success. Four or five late comers followed shortly after. All now were in and chattering.

On November 15 an attempt was made to observe the morning egress of the swifts from the rock. With Mr. Henri Hill, the writer was at the swift rendezvous at 6:15 a.m., when the light was barely sufficiently intense to write notes. The Horned Owl still was in voice, and the sun was some time short of rising. Notes of the swifts came from the rock. The sun struck the rock at 7:40 a.m. Three swifts emerged at wide intervals between 10:32 and 10:33 a.m. and immediately flew high over the canyon. Off and on swift voices continued to come from the rock, as they had throughout the morning, but no more swifts appeared up to the time of our departure at 12:00 m.

On November 29, according to Mr. Hill, the swifts entered the nightly quarters at 5:05 p.m. They had fed in the air above the canyon about 15 minutes before entering the rock. Mr. Hill's estimate of the number on this occasion was sixty to sixty-five individuals.

No observations were made in December, but on January 9, 1937, Mr. Hill reported that only about a dozen birds were seen entering the roosting place in the rock. He also reported observing two dead birds on the road beneath the niche entry. On January 23, 1937, Mr. James Peterson reported three dead swifts beneath the entry. Two of these were probably those noted by Mr. Hill. Could the unseasonable and prolonged cold weather of January be held responsible for these dead ones and the striking diminution in numbers? The problems of securing aerial insects, the food taken by these birds, may be difficult to solve on occasions such as these.

The rock wall above Sycamore Canyon Road was visited on March 6 and again on April 4, 1937, and although we stayed until the light faded and notes could no longer be written, Poor-wills hunting on the road were the only solace. *There were no swifts!*

Many interesting problems of numbers, year-round residence, reactions to light, to temperature, and available food, remain to be solved in connection with the Alum Rock Canyon White-throated Swifts, but their method of going to bed remains as one of the most amazing avian spectacles of the bird world.

San Jose State College, San Jose, California, April 21, 1937.

NOTES ON THE BARN OWLS OF THE SAN FRANCISCO BAY REGION

By CLARENCE F. SMITH and CRANSON L. HOPKINS

This paper presents the results of studies of the nesting and food habits of the Barn Owl (*Tyto pratincola*) made from 1931 to 1934 in Marin, Contra Costa, Alameda, and San Mateo counties, in the San Francisco Bay region of California. Both authors have examined and analyzed pellet material and in addition have contributed numerous field notes. We are indebted to the Audubon Association of the Pacific, the members of which initiated the study, for the use of pertinent material gathered by them, and to Dr. Seth B. Benson, of the University of California, for assistance in the identification of difficult mammalian specimens.

NESTING.—The well-known tendency of Barn Owls to inhabit buildings erected by man gave rise to speculation concerning habits of these birds in the absence of buildings. Also, the question arose whether the owls would accept nest boxes placed for their use in suitable localities. In places where there were no buildings, the owls commonly were found to use cavities made by the weathering of earth banks. At one particularly suitable situation several pairs of birds nested in such close proximity as to suggest colonial habit. A typical burrow had an opening about 10 inches in diameter and was 3 to 4 feet deep. The floor of the tunnel usually had only a gentle gradient, without turns. During the winter season many of these nest cavities were closed by dirt slides or were washed away by the rains, but new sites always were resorted to. It was not determined whether the owls dug out some of the openings, or whether they used only what chance offered them. Evermann (Ornith. and Ool., vol. 7, 1882, p. 109), in his study of southern California Barn Owls, was ". . . convinced that the owls themselves make many of them" by hollowing out a slight hole or crevice with their claws. Rock ledges, wherever available, also are used by the owls, and these sites are much less affected by weathering processes than are the earthen ones. One such ledge, occupied for nesting purposes during at least two seasons, was situated about 4 feet above ground and formed a triangular cave 4 feet high at the apex by 3 feet in greatest depth. There was a narrow crevice at the rear that led into a pocket into which the parent owl often crept when the nest was visited. This cavity also was used as a roosting place by the mate of the brooding bird. Protection afforded the owls when inside the shelter was almost perfect, as there appeared to be but the one opening into it.

In natural situations the eggs are laid in a crude shallow cup formed among the broken-up pellets which serve as a nest. In hay lofts the eggs often are laid on the surface of the hay, with little or no attempt at nest building, which habit often results in accidental damage to the eggs by persons working in the barn.

Boxes were placed at a number of known nesting and roosting sites in a great variety of situations; some were in barns and others were in trees. Those in barns were utilized for nesting purposes *in every case*. This apparently unknown tendency may assist those interested in the birds in providing them with safe and suitable retreats; for such sites, either "natural" or in buildings, seem to be at a premium. Ordinary apple boxes are effective and should be completely enclosed at the ends and on three sides. The open side should be partially closed by a board 2 to 3 inches wide nailed along the bottom of the box in order that the eggs or nesting material may not be pushed out by accident. Ordinary straw makes an acceptable floor, although nest material is not actually necessary.

The localities studied during the investigations are distributed as follows: Marin County, 4; Contra Costa County, 2; Alameda and San Mateo counties, 3 each. Both

the Contra Costa nests were in Moraga Valley, near the town of Moraga. One bird nested in a box placed by Hopkins for that purpose inside a barn, and the other made its nest in a narrow space between the barn wall and stored bales of hay. The San Mateo County nests were all in "natural" sites, one being in a crevice of a rock about 8 feet above ground near Half Moon Bay, the other two in natural cavities in dirt banks near Colma, both being somewhat higher above the level of the ground. Three of the Marin County nests were in Elk Valley and one at Point Bonita. All these nests were in boxes set up for the purpose, either in barns or at regular roosts. Information from Alameda County pertains to roosts, one of which has at times been used as a nesting locality by the owls. Hopkins later found many burrows in Corral Hollow, Alameda County, in hard conglomerate formation.

Food.—Although there has been some controversy concerning the reliability of pellet analysis as a method of determining the diet of predatory birds, observations and direct experiments have established beyond doubt that, at least for Barn Owls, data obtained from the analysis of such pellets are highly reliable as an index to the full range of food items.

The material here presented is based upon examination of 87 pellets or pellet samples from 12 nesting or roosting sites of the Barn Owl. Hopkins collected and examined 46 pellet samples, representing approximately 100 pellets from 10 of the nests, and he and Smith collected 41 pellets from 2 other nests. Smith analyzed the latter and also verified the identifications of the pellet samples examined by Hopkins. Examinations were made by separating skulls, feathers, or other diagnostic items from the rest of the pellet material. Microscopic examinations of the remainder were not made.

Remains of at least 338 vertebrates were found, but only two of these, amounting to 0.6 per cent of the entire food, were birds. No remains of lower vertebrates were found, the remaining 99.4 per cent of the diet consisting exclusively of mammals. These and subsequent percentage figures represent only the frequency of occurrence, and do not take into account the size or bulk of the prey.

Three mammalian orders were represented. By far the greatest number of individuals, 323, were rodents, and they comprised more than 96 per cent of the food. Insectivores were represented by only 8 individuals, and the rabbits (Lagomorpha) by 5.

Of the insectivores, moles (*Scapanus latimanus*) occurred twice in pellets from Alameda County and once in those from Marin County. Shrews (*Sorex* sp.) were represented twice in the material from Contra Costa County, and *S. vagrans* three times in that from San Mateo County. Rabbits had been taken in two counties, the remains of 3 specimens of *Sylvilagus* sp. being noted from Marin County and 2 specimens of *S. bachmani* from San Mateo County.

The California meadow mouse (*Microtus californicus*) formed the predominant element of Barn Owl diet, except in Marin County where the pocket gopher ranked first. Remains of at least 168 individual meadow mice were noted and these comprised more than half the entire number of vertebrate individuals found. Seventy pellets or samples contained the remains of this mouse. In compiling the data by counties, it was found that the meadow mouse constituted 72 per cent of the food of the Barn Owls from San Mateo County, 36 per cent of those from Contra Costa County, 67 per cent of birds from Alameda County, and 28 per cent of those from Marin County.

Throughout the region as a whole, the pocket gopher (*Thomomys bottae*) was next in importance, being represented by at least 72 individuals. Only in Marin and Alameda counties, however, does this animal appear in numbers. In Marin County, 57 pocket gophers were taken; in Alameda County 10; in Contra Costa County 3; and in San Mateo County, 2.

Remains of 46 deer mice (*Peromyscus* sp.) were noted, 25 in pellets from Marin County, and 21 in those from San Mateo County.

Other rodents were represented by a combined total of 35 occurrences: the harvest mouse (*Reithrodontomys megalotis*) was recorded 14 times; house mouse (*Mus musculus*), 12; wood rat (*Neotoma fuscipes*), 4; jumping mouse (*Zapus orarius*), 4; pocket mouse (*Perognathus* sp.), 1.

Eleven of the harvest mice occurred in material from Marin County, and 3 in that from San Mateo County. Of the house mice, 6 were recorded from the owls in Contra Costa County, 5 from those of Alameda County, and 1 from San Mateo County owls. Wood rats were noted twice in pellets from Marin County, and once each in those from Alameda and San Mateo counties. The jumping mice were all from one nest in Marin County, and the pocket mouse was from Contra Costa County.

Other food items included one specimen each of the Western Sandpiper (*Ereunetes mauri*) and the Western Meadowlark (*Sturnella neglecta*), both from Marin County. Jerusalem crickets (*Stenopelmatus longispina?*) may be considered to occur regularly in the food of the Barn Owl, as is indicated by their presence in many of the pellets from each of the counties concerned. Although some of the pellets contained remains of Diptera and Lepidoptera, the association was such that it seemed improbable that these insects had been taken as food.

The food tendencies of the Barn Owl indicated here compare favorably with similar examinations made in other parts of the country and again demonstrate the highly stereotyped character of this bird's diet. It will be noted that 241 of the 338 vertebrate individuals recorded, composing more than 70 per cent of the entire food of Barn Owls, were meadow mice and pocket gophers. These two rodents are among the species most destructive to orchard and field crops in regions where they occur, and consequently their presence in cultivated areas is undesirable. The remaining 30 per cent of the food consisted chiefly of species that have little direct effect upon man's economic interests. Only the shrews and the meadowlark can be considered economically beneficial to man.

The complete absence of ground squirrels in the food of the owls is worthy of special mention inasmuch as they are recorded by Evermann (*op. cit.*, p. 97) as being one of two principal food items of this bird in southern California some 55 years ago. Ground squirrels (*Citellus beecheyi*) are not uncommon in some of the areas represented in this report, and although they are diurnal, it seems as though the percentage taken by Barn Owls should remain more or less constant where both occur. The other important food item found by Evermann was the pocket gopher, still important as food for the owls in at least part of the San Francisco Bay area. It is also noteworthy that no house rats (*Rattus* sp.) occurred in the material analyzed. The relationship of Barn Owls to other birds is well shown in a report quoted by A. K. Fisher (Hawks and Owls of the United States in their Relation to Agriculture, U. S. Dept. Agr. Bull. 3, 1893, p. 135), which indicates that domestic pigeons (*Columba livia*) and Barn Owls have nested together in the same hay loft without harm to the pigeons. Other records from all parts of the Barn Owl's range substantiate the conclusion that birds are preyed upon only under unusual circumstances.

An interesting side light was the discovery of the jumping mouse (*Zapus orarius*) from a new area: in Elk Valley, Marin County. Previously this mouse had not been known south of the Point Reyes peninsula in Marin County. This record shows a secondary value of pellet analysis in determining the distribution of other animal life in an area.

Bureau of Biological Survey, Washington, D. C., and *920 McKinley Avenue, Oakland, California, March 29, 1937.*

BIRD DAMAGE TO ALMONDS IN CALIFORNIA

WITH THREE ILLUSTRATIONS

By J. T. EMLEN, Jr.

Almond culture has been an important industry in California for about fifteen years. At present practically all the almonds grown commercially in the United States are produced in California. Of the various enemies of the California almond grower, birds are by no means the least. Almonds are particularly attractive to birds of the families Picidae and Corvidae, and in certain localities may form a major part of the diet of these birds in the summer months. As a consequence, complaints from farmers have been numerous and insistent.

An extreme case illustrating the potentiality of birds for damage to almonds occurred in the Goodnoe Hills of southern Washington in 1919. Entire orchards, it is said, were stripped clean in a few days by the roving flocks of crows numbering approximately 30,000 individuals (Gardner, Auk, vol. 43, 1926, pp. 447–461). Since captive crows at Davis demonstrated their ability to consume 30 almonds a day, it is easy to see how such a flock could do away with a million nuts or 5000 pounds in a single day—the productive capacity of five average acres.

Less gregarious birds do not have the same destructive potentialities, yet may by persistent activity destroy an appreciable portion of the crop. California Woodpeckers (*Balanosphyra formicivora bairdi*) may account for a surprising number of almonds because of their nut-storing habit. The damage by Lewis Woodpeckers (*Asyndesmus lewisi*) to various orchards of the Capay Valley was estimated at from 1 to 10 per cent in 1912 (Bryant, Monthly Bull., Calif. Comm. Hort., vol. 1, 1912, pp. 362–366).

The objects of the present paper are to present detailed statistics on the extent and nature of bird damage in one locality, and to evaluate, in general terms, bird damage to almonds throughout the state. The results of a study in the control of this damage have been left for a future paper.

The intensive observations for the present study were made on the 1079-acre, University of California farm at Davis during the summers of 1935 and 1936. Five almond plantings were kept under close observation: a creek-bank orchard of young trees covering approximately ten acres; a "variety orchard", containing 45 large trees of 15 varieties; and three small groups of almond trees in large, mixed orchards. Casual observations were made on two additional orchards near Davis and on one near Dixon.

Three types of bird damage to almonds were noted: disbudding by linnets and other species in the early spring; trunk injuries by sapsuckers; and taking of the harvestable nuts by crows, jays, and woodpeckers. Since the latter type was by far the most important at Davis, it will be the only one discussed in this paper.

Four species of birds, in order of their importance as destroyers of almonds on the University farm, are the Western Crow (*Corvus brachyrhynchos hesperis*), California Woodpecker, California Jay (*Aphelocoma californica immanis*), and Red-shafted Flicker (*Colaptes cafer collaris*). Of these the crow is the worst offender, due partly to its taste and capacity for almonds and partly to its gregarious feeding habits during the summer.

Crows were irregular in their feeding schedules and made their visits to the almond groves at almost any time of day between sunrise and sunset. Alighting in an orchard, the members of a flock work individually. Nuts, as a rule, are knocked off before the shell has been penetrated. The birds may follow the first nut to the ground, but more

frequently will look farther, dislodging a whole series before dropping down to clean up the harvest. From a quarter to half of the birds of a feeding flock are generally thus engaged on the ground. Nuts are seldom carried away any distance except as the birds are surprised and flushed while feeding. Opening is accomplished with long vigorous strokes of the partly opened bill. An irregular hole is gouged out of one side or edge of the hull and shell in typical samples.

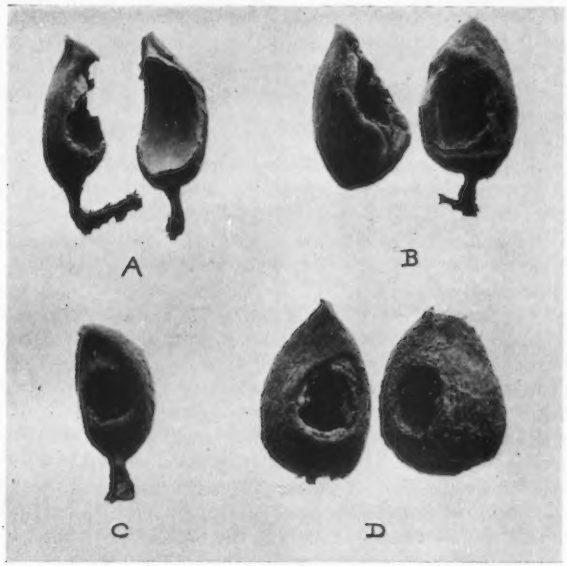

Fig. 55. Almonds opened by various species of birds: A, California Jay; B, Western Crow; C, California Woodpecker; D, Red-shafted Flicker.

California Woodpeckers are independent feeders in the almond orchards. Nuts are occasionally opened and eaten in place, but more often are removed to a convenient high crotch, horizontal limb, or telephone-pole top in the vicinity. There a neat, round hole is drilled in one side of the hull and the contents extracted bit by bit, the bird tilting its head first to one side then to the other as it probes into all parts of the shell cavity. California Woodpeckers fed almost exclusively on almonds in the summer months and could be seen in and around the trees at all times of day. Their activities started at or within a few minutes of sunrise and continued, with an early-morning and late-afternoon peak, till a half hour before sunset.

The quantity of nuts consumed by California Jays on the University farm is considerably less than that taken by crows or California Woodpeckers. Jays work singly save when in family groups, generally entering the tree from below and working upward into the central branches to secure the nuts. A low crotch, horizontal limb, or fence-post top serves as the anvil on which nuts are pounded with partly-opened bill. Drawing upward as far as possible the bird, with half-spread wings, throws its full weight into each stroke. One entire side of the hull is generally removed before the kernel has been completely cleaned out. A small number of nuts is carried away to be eaten or stored elsewhere.

Red-shafted Flickers were not sufficiently abundant or persistent in their attacks to be important as almond destroyers. A pair nested in one of the trees of the variety orchard both in 1935 and 1936, and fed to a large extent on the nuts of a few neighboring trees. Over 200 emptied hulls, each drilled with a neat, round hole, were found below this nest in the 1936 season. A small number of flickers worked out into the creek-bank orchard from the tall cottonwood trees along with the California Woodpeckers.

Other species which were observed taking almonds on the University farm were the Nuttall Woodpecker (*Dryobates nuttallii*) and the Willow Woodpecker (*Dryobates pubescens turati*). Blackbirds have frequently been accused of stealing almonds; but although three species, Brewer (*Euphagus cyanocephalus*), Bicolored (*Agelaius phoeniceus*), and Tricolored (*Agelaius tricolor*) were all common in the orchards, there is no definite evidence that they were feeding on almonds during the preharvest months.

Species which were absent from the University farm and which have been reported to feed on almonds include importantly Yellow-billed Magpie and Lewis Woodpecker.

The first objective of the present study was to measure the extent of the preharvest damage to the University farm almond orchards. The usual technique of food-habit study through stomach examination was not applicable. Almond meats are eaten with little undigestible material, and when broken down in a bird's stomach are difficult to recognize. Pellet analyses are unreliable for the same reason. Crows and jays, when feeding on almonds, almost always drop the empty hulls beneath the trees from which they are taken, and thereby provide a reasonably reliable medium for the measurement of the damage.

In the present study hulls were collected and counted every few days and separate records kept for each tree. Up to July 20 measured crow-damage in the variety orchard was approximately 12,000 nuts (1936) or 60 pounds, roughly 10 per cent of the estimated potential crop of that orchard. By September 1 the accumulated loss had reached an estimated total of 30,000 nuts or 150 pounds, about 28 per cent of the potential crop. Damage to individual trees was often more severe, reaching in certain instances as high as 67 per cent by July 20, and 90 per cent by September 1. Similar figures were obtained for the small plantings in the mixed orchard. Crows, however, did not disturb the almonds in the 10-acre stream-bank orchard during the two years of observation.

TABLE 1. EXTENT (PER CENT) OF PREHARVEST DAMAGE IN THREE ALMOND PLANTINGS ON THE UNIVERSITY FARM, DAVIS, CALIFORNIA. (Harvest date for earliest varieties is about August 10 at Davis.)

Orchard	Western Crow	California Woodpecker	California Jay	Red-shafted Flicker	Totals
Creek bank (10 acres)*	0	5	1	1	7
Variety (1 acre)	20	0	0	1	21
Root-stocks (¼ acre)	20	7	1	0	28

* Only 6 of the 10 acres in this orchard were producing in the seasons of 1935 and 1936.

California Woodpecker damage, on the other hand, was greatest in the stream-bank orchard and in one of the small plantings in the root-stocks orchard, but was negligible or absent elsewhere. These birds do not generally open nuts in the orchard. In the stream-bank orchard the nuts were removed to some near-by cottonwood trees before opening. From a blind located beneath these trees counts of passing woodpeckers were easily and accurately made. Observations covering two months were distributed so as to include all of the daylight hours. From the plotted curves of hourly and daily activity thus obtained, it was possible to compute the total woodpecker harvest with considerable accuracy.

Approximately 700 nuts (3½ pounds) were removed every day from the creek-bank orchard during the height of woodpecker activity. This meant a loss of about 300 pounds or 5 per cent of the estimated potential yield of that orchard during the season. Damage

by California Jays and Red-shafted Flickers was estimated not to exceed one per cent in any University farm orchard.

Almond-eating activities of the various species commenced from 5 to 13 weeks after the termination of the blossoming season and from 5 to 13 weeks before the beginning of the harvest. Ground squirrels were found taking the green nuts as early as May 20

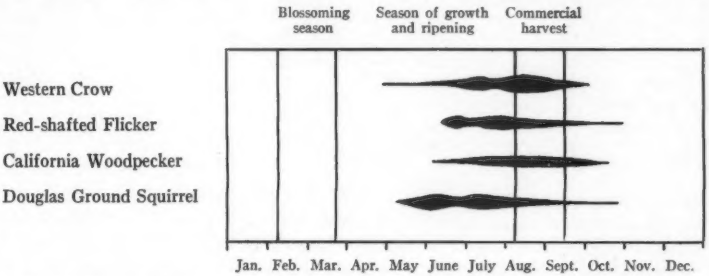

Fig. 56. Seasonal activity of birds and mammals in almond orchards on the University Farm, Davis, California.

and had stacked a quantity of empty hulls by the time accurate daily counts were begun in the variety orchard on June 2. Crows made occasional visits to the variety orchard for nuts as early as April 25, but did not commence their regular almond-feeding activities until the first of June. Jays were first seen opening almonds in the latter part of May. Flickers were present in the variety orchard all spring, but apparently did not start opening almonds until June 15. The California Woodpeckers in the creek-bank orchard began their activities in late June or early July.

The daily deposit of bird-opened nuts under the 45 trees of the variety orchard increased slowly through the first half of June, but rose suddenly about June 20, when crows began working in earnest on two or three trees. From June 30 to July 10 the daily consumption increased rapidly, reaching a peak of over 1000 nuts a day on July 11, 12, and 13. The last 10 days of July saw a slight drop, and from then on, crow activity in this orchard was irregular, due partly, at least, to the presence of workmen in the vicinity. The number of crows increased greatly during August, and since no attempt was made to harvest the crop, flocks of as high as 200 were occasionally seen feeding in and around the trees until the end of that month. By this time the most attractive trees were practically stripped of nuts, and the crows gradually lost interest. A few jays and flickers continued to visit the orchard for the remaining nuts through the fall and winter. California Woodpeckers in the creek-bank orchard not only started later in the season but continued in full swing in the unharvested sections through September.

The intensity of damage in the various trees and orchards was by no means uniform. An unusual opportunity for a comparative study of variety preferences of the crow was offered, particularly in the variety orchard where 14 of the most important varieties were each represented by a row of 3 trees. Two successive years of hull-counting in this orchard thus gave 6 tree counts for each variety. Nonpareils, first in commercial importance, received the greatest attention from the birds during the preharvest weeks, averaging 1036 nuts per tree between June 1 and July 20. Kings were second with a 965 average. Princess, represented by only two trees in each season, was third with 548. Ne Plus Ultra was fourth; California paper shell, fifth; and I.X.L., sixth. (This last-named variety was the most attractive in Gardner's Washington study [Gardner, *loc. cit.*].) Varieties which

received slightly less attention at Davis were Languedoc, Texas, Reams, Lewelling, Peerless, and Drake. No variety was entirely immune, even the iron-shelled Jordans occasionally being opened.

TABLE 2. BIRD PREFERENCES AND SHELL TEXTURE OF THE MORE IMPORTANT ALMOND VARIETIES

Variety	Order of preference	Shell texture	Variety	Order of preference	Shell texture
Nonpareil*	1	paper	Texas	8	medium
King	2	paper	Reams	9	medium
Princess	3	paper	Lewelling	10	medium
Ne Plus Ultra*	4	soft	Drake*	11	hard
California paper shell	5	paper	Peerless*	12	hard
I.X.L.*	6	medium	Eureka	13	soft
Languedoc	7	medium	Jordan	14	hard

* Varieties of commercial importance.

Qualities of the nuts which might be considered to influence the birds in their preferences are size, degree of ripeness, sweetness, and thickness of shell. Size apparently is unimportant. Degree of ripeness, strangely enough, showed no correlation with bird attack after feeding in the orchard had once started, early and late attractive varieties being attacked simultaneously and with equal avidity. Bitter almonds were found to be highly distasteful and even somewhat toxic to captive crows. Aside from sweetness, however, "soft" or "paper" shell seems to be the most important quality of a desirable almond from the birds' standpoint. A list of varieties, graded according to thickness and toughness of shell, closely parallels the birds' order of preference.

It is remarkable how rapidly crows and jays learned to concentrate on the trees bearing the most desirable types of nuts. On one Nonpareil tree in the root-stocks orchard, 60 out of 72 nuts specially marked by the Division of Pomology for growth studies were taken between July 11 and August 3, while a neighboring Texas tree did not lose a single marked nut. Woodpeckers with their adaptations for drilling were less restricted in their choice of varieties.

Variety preferences, however, do not begin to account for the uneven distribution of bird attack in different orchards and in the various trees within an orchard. A supply of almonds in order to be acceptable to a bird species must be supplemented with some kind of loafing or escape cover in the near vicinity. Crows are easily satisfied in this respect and may find the orchard trees with the surrounding fields adequate for the purpose. If the orchard trees are old and large they may also provide adequate cover for flickers, but jays and California Woodpeckers generally require more. California Woodpeckers, for instance, were absent from the variety orchard, where a single row of tall black walnuts was the only supplementary cover, but abounded along the creek bank half a mile away where large half-dead cottonwoods, oaks, and walnuts were more widely distributed.

Crows seldom feed in areas disturbed by frequent human activity. Plantings in close proximity to dwellings or to busy thoroughfares in the vicinity of Davis lost a small percentage of their nuts to jays, flickers, and California Woodpeckers but, so far as is known, were never visited by crows.

The size and shape of an orchard are also important features from the birds' standpoint. Generally speaking, the peripheral trees of an orchard receive the first and greatest attention from birds. Isolated trees, small plantings, or single rows in which all of the trees are peripheral seem to suffer most. A large orchard with a smaller ratio of peripheral to central trees is likely to receive less injury. In the three longitudinal rows of the variety orchard the outer rows, composed of the same varieties as the middle row, lost four times as many nuts.

Financial losses due to birds in commercial production are deducted, of course, from the gross income side of the ledger while the production costs may be raised through expensive control measures. The net profit is therefore seriously affected. Since most California almond orchards are operated at a narrow margin of profit, a 5 per cent to 25 per cent loss, such as that described above for the University farm, would often be sufficient to cancel all profit. Fortunately, in the large commercial orchards losses as high as this appear to be exceptional.

Fig. 57. Distribution and intensity of bird damage to almonds in California; season of 1936. The principal almond-growing districts are circumscribed with a heavy line. Plain areas showed no appreciable damage; stippled areas, light damage; hatched areas, moderate damage. No district reported widespread heavy damage.

Although it is impossible to make direct comparisons between relative statements and the quantitative measurements given above, a summary of reports from county agents and farmers in 15 of the 16 major almond producing counties of California is useful in giving a general picture of conditions throughout the State. Reports from Contra Costa and Riverside counties indicate that the damage is so small as to be negligible. In Tehama, Butte, Yolo, Sacramento, San Joaquin, Stanislaus, Merced, and San Luis Obispo counties losses were generally light. Instances of damage were apparently more frequent in Yuba, Calaveras, and Monterey counties. Marginally located orchards, particularly small groves located in hilly or wooded sections, were most subject to attack. In no county was heavy damage general.

Jays and California Woodpeckers were accused most frequently in the foothill orchards, while over the lowland areas Western Crows appear to be the worst offenders.

University of California, Branch of the College of Agriculture, Davis, California, July 12, 1937.

PRESERVATION OF BIRDS IN CALIFORNIA

By JEAN M. LINSDALE

Ornithologists have a greater responsibility in conservation activities than other people have, whose interests in the outdoors are less specialized. Persons familiar with birds and the conditions at their living places should be fitted to judge the significance of changes in the landscape and other factors which might affect birds. With this advantage in the understanding of conservation problems, bird students ought to give a part of their efforts to the solution of general questions of land use and especially to the problems which involve the preservation of birds. Often the solution bringing the greatest benefit to birds is at the same time the best for other considerations.

At the outset in this discussion we must resolve to order our activities so that efforts will lead to some beneficial result. It is not enough to be active. Not all moves for bird protection have equal value. We might become greatly concerned over a target shooter who kills five birds in a year and at the same time show no interest in some landscaping project which would remove the homes of thousands of animals. To put it another way, it would be far better to become aroused over destructive agencies which affect White Pelicans or Swainson Hawks than over ones which affect only linnets or blackbirds. The paragraphs which follow may be of some use as representing an attempt to evaluate part of the important influences which affect the preservation of birds in California. They are calculated to supplement and bring up to date a report upon the same subject which was prepared eight years ago. (See Condor, vol. 32, 1930, pp. 105–115.) Further consideration may be given to the same species designated then as deserving special attention.

The Sage Hen has become so reduced in numbers in California in recent years that, in 1931, shooting of this bird was prohibited by legislation. But shooting had been only one of several factors important in the decrease of this bird. The harmful effects of grazing, mainly by sheep, have continued, and very little has been done to counteract them in the eastern part of the state. Whether or not the Sage Hen can regain its former range and numbers in California probably will depend upon the protection of range and water holes which it requires. In parts of Nevada not far from the California line the species remains in numbers sufficient to restock depleted areas in this state if the necessary features of the habitat are restored.

Records of the California Clapper Rail have been noticeably frequent in recent years, but that does not necessarily mean an increase in the species. It seems more likely to indicate greater accessibility to people, of the remaining bits of rail habitat. Improvements and road construction in the marshes have made it easy to find rails in a short time, but they have at the same time cut into the remaining range. The opportunity remains for some person or organization to provide a permanent refuge for this and other salt marsh inhabiting animals in the vicinity of San Francisco Bay. This would involve permanent ownership in a spot not likely to be condemned for public use. It is not certain that any such suitable area exists; if not, there appears little hope that this set of animals will continue long to live in the San Francisco Bay district.

Shore birds, ducks and geese seem to me to be considerably better off in California than they were eight years ago. I am unable to say why there should be any more shore birds, if there are. The ducks and geese may be responding to the increased amount of land set aside for refuges for them, or they may have benefited from modification of the shooting regulations. With the continued improvement and acquisition of refuges by the federal government, at Klamath Lake, Tule Lake, Clear Lake, the Spalding Ranch

in the Sacramento Valley, and at Salton Sea, by the state near Gridley, Suisun, Los Baños, and in Imperial Valley, and by the latter and other agencies as at Lake Merritt, San Leandro Bay, Berkeley Aquatic Park, and many water storage reservoirs, a large number of resting and feeding places have been provided for water birds in the shooting season. Some of these are beneficial as well for nesting purposes.

The California Condor continues to be in imminent danger of extinction. In the past year or so several persons and organizations, some of them outside the state, have given considerable thought and some action toward solving the problem of preserving this bird. This worthy activity may serve to prolong the life of this striking species, but prospects of maintaining it permanently seem less promising each year.

A certain group of raptorial birds, including the Prairie Falcon, Duck Hawk, White-tailed Kite, Red-bellied Hawk, Golden Eagle, Bald Eagle, and Osprey, all represented by small numbers in California, are subjected to three main sorts of injurious influences. Because of peculiarities in the living quarters of most of these species, only a small population can be supported in the state under the most favorable conditions. But intensive human use of land tends to remove the suitable places for some, as, for example, the Red-bellied Hawk. However, for these birds there is no doubt but that the greatest handicap is simply the fact that they are hawks, and hawks are animals to be killed, according to the most widespread notions of "conservation". The reasoning to support these notions is so simple and so convincing, even if fallacious, that few persons, among the small number who may have learned better, are willing to be on the unpopular side by hindering the practices of vermin removal. The species named above are ones least able to endure the increasing demands by shooters not only for the privilege of killing them but for officially planned and executed removal of carnivores. The third important danger to these birds is from the competitive zeal of egg collectors. There is no doubt but that all of these species could be preserved in this state, by just a little more effort in their behalf on the part of persons who are best prepared to understand the food relations of hawks to other kinds of animals.

It may be doubted whether widespread publicity in favor of preserving these birds would have the desired effect, because the persons desiring to remove them have the means to smother it with more extravagant "news" of an opposite character. The best hope for success in this situation seems to be in influencing the advocates of vermin killing by pointing out flaws in their traditions.

Another California bird, the Yellow-billed Magpie, is traditionally considered to be a rarity by bird students and, at the same time, a great pest by many practical out door people. Any person who takes the trouble to study this peculiarly Californian species will find that it is not rare, despite its small range, nor could it be considered really a pest, even though it is a corvid. Yet there is an ever present prospect that so much prejudice could be aroused as to result in as great reduction in this kind of magpie as has occurred in the case of magpies in many other countries. It is not too late to plan for the future welfare of this species—though it may be so in the cases of the Condor, the White-tailed Kite, and the Clapper Rail.

It may be profitable to turn from the consideration of particular kinds of birds to the situation as regards the whole avifauna of the state. One of the first steps is to understand the various types of land in the state, especially their characteristics that would affect animals, and their extent. We must know how birds respond to forest land, desert land, brush land, and farm land, but also we must know the locations of the types and something of the kinds of human use made of them. In general, we have some notion of how different kinds of farming, grazing, or lumbering affect birds, but to interpret local experiences in terms of the whole state requires much study.

TABULATION OF SOME TYPES OF LAND AREA IN CALIFORNIA

	Acres
Land area of state	99,617,280
Cultivatable land	23,000,000
Land in 150,360 farms (1935)	30,437,995
Land drained for agriculture	2,233,714
Potentially irrigable land	18,000,000
Area under irrigation, 1930	4,746,632
Water supply available for	6,200,000
Non-agricultural land	76,000,000
Original forested area	23,000,000
Present forested area	18,270,000
Present virgin timber	13,200,000
20 national forests	19,164,573
Grazing land in national forests	11,389,000
Land burned over in 1936	946,850
Public domain	15,676,000
National parks and monuments	2,887,776
State parks (70)	292,557
Federal bird refuges	120,000
State game refuges	2,600,000
Wilderness areas	1,493,500
PEOPLE IN CALIFORNIA	
Total (1930)	5,677,251
Urban (73.3%)	4,160,596
Rural	1,516,655
Farm	620,506
Number per square mile (1930)	36.5
Per cent increase in 10 years	65.7
Hunters' licenses (1935)	189,125
Buyers of migratory bird hunting stamps (1935)	33,353
Game wardens	125
Bird students	500±
Collectors	200—

We often hear comments on the remarkable increase in farming in recent years in California, but actually in the past half century there has been almost no increase in the amount of land farmed. The acreage has remained at approximately one-fourth the area of the state. But great changes have taken place on this land, which involved increase in number of farms, more intensive cultivation, increased production per acre, and greater amount of improvements. This last item includes buildings, roads, lawns, trees, canals, and the like. Except for the land that has been drained for agriculture (a little more than 2 per cent of the whole state) enough ground remains that resembles the original area now farmed to provide habitats for practically all the kinds of birds originally found there. The problem of providing habitats to preserve species of birds displaced by cultivation of land in this state is not an important one, and our attention can be turned to more pressing questions.

The non-agricultural land, comprising three-fourths of the whole state, has come to be the part requiring most careful consideration if the animal life is to exist in its proper relation to the land. And this is the land where birds seem to have their greatest value for people. In some ways the presence and activities of birds on cultivated land remain the concern of the land owner, but there is a greater public share in the life of the unfarmed area. Since only one-third of this great area originally was forested, there remains more than half the state which can be neither forest nor farm land. Here, despite the many injurious human practices that have hindered the existence of native animals, the natural fauna has been favored to some extent by the unfavorableness for

the usual kinds of human activity of the topography, soil, and climate. The extent of habitat offered to birds on this land is huge in the aggregate. Except for those kinds which require special amounts of water, and for the ones shot as game, there need be no great concern over the persistence of birds here.

For further study of kinds of lands available for birds and especially the relationships of those types of land and their animal inhabitants to human welfare, several recent publications contain much valuable material. Among these the Report of the National Resources Board (1935) is remarkably complete and concise in its analysis of the whole country and the influences which affect it. Another brief survey of the same problem, more easily obtained and more easily read, is the book "Deserts on the March," by Paul B. Sears, which was published in 1935. "The Western Range", published in 1936 as Senate Document 199, deals with many phases of the most important problems affecting the whole state of California, and it treats them from the authoritative viewpoint of the Forest Service. A summary of these problems from the point of view of national parks is contained in the 20th Anniversary National Park Supplement to Planning and Civic Comment (vol. 2, 1936). All these deserve study by any person who contemplates any activity in the preservation of birds.

California has long been a leading state in designating land for special purposes, many of which tend to benefit bird life. The point seems to have been reached where, although special bits of land may still be added profitably to the reserves already established, the greatest need is for suitable administration of those areas. It is desirable to consider not alone the amounts of the various kinds of land for these special uses, but their quality and diversification and especially their availability to people and to wild animals. Often multiple forms of use are feasible and even desirable if the whole state is to be benefited. Among the kinds of sanctuaries deserving notice are national parks and monuments, state parks, federal bird refuges, state game refuges, and wilderness areas.

The great acreage of national parks and monuments in the state alone might indicate an acme of appreciation for this high type of land use and there is a surprisingly staunch concern over the welfare of the parks. This is fostered by a strong, centralized control over the parks which attempts to forestall those commercially inspired schemes which tend to detract from the general values of the areas, including some of their special uses for birds. Some especially desirable bird nesters in the parks can be driven from them, and even from the state, by too eager bids for large attendance at places which need to be kept secluded. No doubt this has happened already at some of the lakes in the vicinity of Lassen Peak.

The building of California's state park system, which has occurred in the past eight years, is remarkable for the quality and extent of land acquired, but to me that program was also notable because of the absence of interest in it shown by persons especially acquainted with birds or animals. It is little wonder that scenic qualities have been given the main consideration in planning the system. Too often, in late years, state parks have been considered as of second rate importance and as places where relief money could be spent in providing cheap and accessible playgrounds for city dwellers. California's parks deserve a better classification than this, and better treatment than this rating would imply. Moreover the suitable administration of them should be the concern of every person who is interested in the welfare of the native animal life. Overenthusiastic management easily could detract from the values of the park lands as they existed under private ownership.

A somewhat similar situation exists with respect to the newly acquired refuge lands for waterfowl, whether of federal or state ownership. These establishments can be set up

more easily than they can be administered for the greatest benefit to the animals. Since these lands belong to the public and they are supposed to supply needs of wild animals, persons with special knowledge of those animals should take sufficient interest in the areas to know their status and to contribute toward effective handling of them. Many problems require solution before the refuges can be made thoroughly effective. Unwise practices are likely to affect them adversely even with the most conscientious administrators in charge.

We are becoming accustomed to rapid and extensive changes in all of our affairs, and these extend to the affairs of the native animal life. Some of the notions so freely discussed by naturalists need to be examined rather carefully before we accept them completely. In this connection, I single out for brief mention the three topics: Collectors, vermin, and wildlife management. None of these is a new topic, but recent discussions of them appear to lead to rather extreme stands in one direction or another and to make opportunity for sharp debate.

As to collectors of birds in California, I have heard many serious accusations and many vehement defenses of their activities. When we examine the list of persons that have been granted permits to collect birds in the state, we find the total is very small. If the list is studied further, it becomes obvious that only a few individuals—probably fewer than twenty-five—do any collecting at all. But there is some basis for complaint; for half a dozen expert collectors of eggs for exchange are able to affect harmfully the welfare of important bird species. It seems fair to conclude that there has been far too much collecting of eggs on account of their exchange value and far too little collecting of specimens for their value in the study of natural history. Rather than condemn all collecting or defend all collecting, it would be better to distinguish between the two kinds mentioned, to discourage the former, and to encourage the latter which can do no permanent harm to bird populations.

Birds eat portions of some planted crops in a few sections of the state. Accounts have been assembled to show that much economic loss results from the feeding habits of a few kinds of birds, but such demonstrations must depend upon too meager facts to expect them to be successful, although there is no question but that individual farmers can trace failure of one of their crops to raids by one or more kinds of birds. Even in the extreme instances, however, other factors are at work which contribute to crop failure, so that it becomes practically impossible to fix the amount attributable to birds. Complaints against birds range from justifiable ones to ones where the farmers actually shoot birds to prevent their eating fruits which it is not intended to harvest.

After the expansion of agencies for the removal of mammals it was natural to expect a demand for the control of any birds which might feed upon cultivated plants. Local agents, in response to this desire, planned extensive control campaigns of which the one conducted in 1927 in Tulare County became most widely known. There, in one season, the bird population was reduced "at least 80,545" (Wheeler, The Exeter Sun, vol. 26, no. 23, 1927, p. 14) during a contest conducted among boys. After this activity there was much unfavorable comment and a closer relation between county, state, and federal workers concerned with the problem.

The situation for killing birds differs from that of mammals mainly because there is a more far-reaching public interest in birds than in mammals. A campaign to poison birds intentionally, even on a much smaller scale than has been tried for mammals, probably would attract the attention of many people and it might bring such a storm of protest as to require abandonment of the whole program for the artificial control of vertebrates. A few officials have understood this situation, and they have been active

in their attempts to forestall a recurrence of the obstacles which impeded efforts to kill mammals.

Management of wildlife has become an attractive occupation to outdoor people in late years. Possibly the expansion of interest in this field has been too rapid to be stable, and the present developments may not represent the aims of the sponsors of the movement. Nevertheless it may be well to consider how we may expect planned management of wild animals and plants to solve the main problems of preserving them. When we consider the difficulties encountered with the most successfully domesticated animals and then think of application of the practices to free-ranging wild individuals and species, promise of quick success may seem remote. Game management is capable of developing soon into an attempt to farm one or a few species to the limit on the land, and thus it may be no different from farming for corn, cows, or poultry. The results then may be inimicable to wild plants and animals in general.

A study of the many factors which affect numbers of birds brings the conclusion that only one constitutes a serious threat to the bird life of the state. This involves the attitude of people toward birds. The early development of agriculture on the Great Plains was accompanied by an increase in some kinds of birds. There were attempts, in the '60's, to kill off birds. Next, Glover, Aughey, King, Forbes, and Snow examined food of birds and came to the conclusion that birds were valuable as aids to crop raising. They not only convinced themselves, but they convinced the whole United States. Much of our accepted notion as to the place of birds in agriculture is directly traceable to this group of workers. Since that time, fifty to seventy years ago, great changes have taken place in agricultural practices, and a great deal has been learned about insects and their lives. The early, widespread, and convincing arguments that birds would save cultivated crops are still too prominent in conservation discussion and thought.

Now, the attitude towards birds is rapidly swinging to one of indifference or of actual disfavor. Birds are often unwisely considered as hindrances to some kind of human activity. The result is that no effort is made to allow the operation of factors which favor the maintenance or increase of bird life, but many determined efforts are being made to "regulate" numbers of birds. This usually means reduction of some species. The notion that all values, even those intangible ones involved in recreation, are to be measured in terms of dollars has done, and promises to do, more harm to our bird life than any other single factor.

Finally, we must remember that California's avifauna is characterized by a large number of species but a relatively sparse representation of individuals. Changes that have accompanied the settlement and development of the land have been as follows: A slight decrease in the number of species; some of the uncommon species have disappeared; many species have been greatly reduced in numbers and in area; a few species, common ones already, have increased greatly in numbers. The greatest need is for a revised attitude toward birds which will tolerate and encourage them for their true values.

Museum of Vertebrate Zoology, University of California, Berkeley, March 11, 1937.

A NEW HOUSE FINCH FROM CENTRAL MEXICO

By ROBERT T. MOORE

For some time the author has been convinced that the large House Finches of Guanajuato represent a new form, differing not only from the described forms to the east and south but also from the birds of the Central Plateau to the west, formerly known as *rhodocolpus*. It seemed better to hold description in abeyance until the accumulation of additional specimens from southwestern Chihuahua might determine whether the Jalisco-Durango plateau birds are closer to *frontalis* of New Mexico and Texas or to so-called *sonoriensis* of Sonora. Fourteen fresh specimens from localities in southwestern Chihuahua and ten from northeastern Sinaloa have simplified the problem. I am therefore describing below the form from Guanajuato.

Carpodacus mexicanus centralis, new subspecies. Guanajuato House Finch.

Type.—Male adult in worn breeding plumage; no. 105265, coll. U. S. Nat. Mus.; Guanajuato, Mexico; collected by Prof. Alfredo Dugés.

Subspecific characters.—Largest of all races of *Carpodacus mexicanus;* differs from *C. m. potosinus, C. m. nigrescens* and *C. mexicanus mexicanus* not only in this respect but also in greater extension of red on underparts of breeding males; differs from the former two, in addition, by less heavy, and lighter-colored, streaks below.

Its great size and much heavier streaking distinguish *centralis* at a glance from *rhodopnus*, as well as from so-called *sonoriensis* and *ruberrimus*. It is closer to the large birds of southwest Texas (*frontalis?*), but from them it is distinguished by greater extension of red on the underparts and by larger size.

Range.—Vicinity of Guanajuato City, probably extending over the adjacent mountains and plateaus above 6000 feet.

AVERAGE MEASUREMENTS OF MEXICAN RACES OF CARPODACUS MEXICANUS

Males	Wing	Tail	Exposed culmen
6 adults, Guanajuato (*centralis*)	82.2	63.6	10.5
7 adults, San Luis Potosi (*potosinus*)	80.4	60.6	10.0
11 adults, Mexico, Morelos, Puebla (*mexicanus mexicanus*)	80.3	63.9	10.2
17 adults, Guerrero (*mexicanus mexicanus*)	77.2	60.2	10.8
12 adults, Durango, Jalisco, Nayarit, Colima (*frontalis?*)	79.5	60.3	10.6
4 nesting adults, near Parral, Chihuahua	79.8	60.2	10.1
5 adults, southwestern Texas (*frontalis*)	78.6	59.8	10.2
7 spring adults, Guaymas (*sonoriensis?*)	74.7	57.1	10.0
3 spring adults, Batomotal, Sonora (*sonoriensis?*)	75.3	55.8	9.5
4 spring adults, Alamos, Sonora (*sonoriensis?*)	74.4	57.1	9.9
3 fall adults, Batopilas, Chihuahua	74.3	57.1	9.9
4 (August) San Feliz, Chihuahua	72.8	55.1	10.3
11 spring adults, Sinaloa (*rhodopnus*)	71.1	55.23	9.55
11 winter adults, Sinaloa (*rhodopnus*)	71.2	54.8	9.51

Specimens examined.—*Centralis*, 5♂♂ "Guanajuato", 2♀♀ Tupataro, Guanajuato. *Potosinus*, 9♂♂, 9♀♀ San Luis Potosi. *Nigrescens*, 2♂♂, 2♀♀ Miquihuana, Tamaulipas. *C. mexicanus mexicanus*, 27♂♂, 8♀♀ from Vera Cruz, Hidalgo, Mexico, District Federal, Morelos, and Puebla; 20♂♂, 5♀♀ Guerrero. *Roseipectus* (?), 2♂♂ Huajuapam, Oaxaca. *Frontalis* (?) Jalisco, 1♂ Talpa, 1♂ Mascota, 1♂, 2♀♀ Guadalajara, 1♂, 1♀ Tonila, 1♂ La Barca, 2♂♂ Ocotlán, 1♂ Zapotlán, 1♀ Bolaños, 1♂ Colotlan; Durango, 1♂, 2♀♀ Durango City, 1 im.♂ Papasquiaro, 1♂ Guancevi, 1♀ Jude; Michoacan, 1♂ Patzquaro, 1♂ "Mountains of Colima", 1♂ "Tepic". *Rhodopnus*, Sinaloa, 26♂♂, 14♀♀. Birds known as *sonoriensis*, 42♂♂, 14♀♀, Sonora. *Frontalis*, 51♂♂, 30♀♀ from Colorado, New Mexico, and southwestern Texas. Intergrades, Chihuahua, San Feliz, 4♂♂, 5♀♀, San Francisco Ltd. Mine near Parral 4♂♂, 1♀; *sonoriensis* (?) 3♂♂, 2♀♀ Batopilas.

The type of *Carpodacus rhodocolpus* Cabanis, collected by Deppe at Cuernavaca, Morelos, has proved to be an example of *C. mexicanus mexicanus* (van Rossem, Bull. Mus. Comp. Zool., vol. 77, 1934, pp. 419–420). Having confirmed this by my series of eight fresh specimens from an area within ten miles of Cuernavaca (Ocotepec,

Tres Marias, Atlacomulco), I do not, however, agree with van Rossem that *sonoriensis* could "be stretched to cover the house finches of central western Mexico." Whatever the final decision as to the validity of Ridgway's name *sonoriensis*, both the winter individual from Alamos marked as the type, and all of the large series of spring specimens, known from the localities of his so-called "cotypes", Alamos, Guaymas, Batomotal and Batopilas (October specimens), are less heavily streaked and obviously smaller (wing 74.6 mm.) than the birds of the plateau region (wing 79.5 mm.). The contrast with *centralis* of Guanajuato (wing 82.2 mm.) is much greater.

It is clear that the birds of this high plateau region (Durango-Jalisco-Colima) have their affinities with the medium-sized and streaked *frontalis* of the plateau area of Colorado-New Mexico rather than with the small and little-streaked birds of the sea-level deserts of Sonora and northern Sinaloa. This is confirmed by the large size of the author's series (wing of males 79.8 mm.) from the San Francisco Mine, southern Chihuahua, which series connects the Durango birds with *frontalis*. Two birds from El Carmen and Durasno, Chihuahua, have the heavy streaking but smaller size of *frontalis*. Starting with birds of practically the same size in eastern Oregon and Colorado, House Finches on the arid west side of the Rocky Mountains become smaller toward the south until they acquire the smallest size in Sinaloa, whereas those on the east side become larger until they attain the largest size in Jalisco and Guanajuato. Eventually the Transition Zone birds of Jalisco and Colima may have to be separated from *frontalis*, but they can well endure that name until the present gaps are bridged by series from the Transition and Austral zones of Chihuahua.

The series from San Feliz, 125 miles southwest of Parral and 85 miles south of Batopilas, may be classed tentatively as intergrades between *rhodopnus* and *frontalis* (?) of Durango. They are only slightly larger than the former, but have the restricted red coloration of the plateau birds. The streaking of underparts is extraordinarily wide and black, recalling *potosinus* and *nigrescens*, and is much more prominent than in either *frontalis* or *sinaloensis*. The high altitude (7500 feet) of this western slope of the range places San Feliz in the area subject to heavy local rainfall, probably more than forty inches annually, contrasting sharply with the aridity of the Barranca del Cobre at Batopilas or the eighteen inches annual rainfall at Parral. The immatures of this series have just completed their postjuvenal molt and two adults are in the middle of their postnuptial molt.

The Goldman series from Batopilas, whose "smaller size" van Rossem (Condor, vol. 39, 1937, p. 38) indicated as ground for invalidating *rhodopnus*, proves on remeasurement to be of almost identically the same size as breeding adults from Alamos and *larger* than the average of nineteen winter adults from southern Sonora. Van Rossem entirely overlooked Ridgway's table of measurements (Birds N. and Mid. Amer., Part I, 1901, p. 136) where the slight differences between birds of Batopilas and Alamos forecasted their similarity. Freshly-molted fall males are somewhat less extensively red on the underparts than are those of the Alamos series and are plainly, though narrowly, streaked, thus differing markedly from *rhodopnus*. Coming from near the bottom of the enormous arid canyon, whose river system cuts a tremendous gouge a mile deep and many miles wide into the face of the Mexican Plateau, these specimens have the appearance of the desert birds of Guaymas, one group of Ridgway's cotypes of *sonoriensis*.

Anyone who reads the author's paper (Condor, vol. 38, 1936, pp. 203–208) with care and who studies the tables will realize that the discussion there given of the validity of Ridgway's "marked," migrant type of *sonoriensis* was concerned solely with the relation of southern Sonora birds to *ruberrimus* and not to *rhodopnus*. The author admits

he overlooked publishing his comparison of the Batopilas series of cotypes, but he erred because he failed to realize that the purport of his paper might be twisted into a mere attempt to prepare a safe bed for a new race and believed the synonymic identity of *sonorensis* and *ruberrimus* had been proved. The criterion of the true scientific approach is an ardor for all the facts, not merely a zest for nomenclatural niceties, which easily can be overemphasized to conceal really important problems of distribution. The criterion of the "approach" of this criticism is its author's failure to examine a single one of the thirty-three specimens (Moore Collection) of *rhodopnus* and on this failure to obtain essential facts rests his "emphatic opinion" that "*sonoriensis* will easily include *rhodopnus*"! I am heartily in accord with the claim that the matter is still "open" for a reviewer. Certainly the status of *sonoriensis* is not a simple problem, as it involves discontinuous distribution. I do not believe the final decision one way or the other will affect the validity of *rhodopnus*.

California Institute of Technology, Pasadena, California, July 15, 1937.

THE SWALLOWS AT THE LIFE SCIENCES BUILDING

By JOSEPH GRINNELL

Our campus list of birds has from the start included the Cliff Swallow (*Petrochelidon albifrons*), even though whole years have passed without report of even one individual of this species within our area. Back in 1909, and maybe previously, there was a nesting colony on an old barn up Strawberry Canyon; but with the wrecking of that building there could be no return of the swallows there. Also, from time to time, nesting groups of cliff swallows have been seen or reported on buildings within or close to the city limits of Berkeley.

The Life Sciences Building was carried through to completion in the year 1929; but not until 1935 was any notice of its presence taken by any swallow, to my knowledge. In that year, on or about June 1 (note the lateness of the date) cliff swallows first appeared about this building, and at once they began nesting activities. On June 23, I saw several nearly or quite completed nests in the little niches of the walls, high up, at the southeast and southwest corners of the building. On that date I judged there were about 20 pairs of the birds about, all told. The nests were much scattered, and some of them may not have been completed, or at least not occupied to the stage of bringing off broods.

The point I make here is that in 1935, a small group first selected our cement walls, which are cliffs to them. I might speculate that this initial group was comprised of yearling individuals that had tried to nest elsewhere earlier the same season and met with disaster.

It was in 1936 that the story of the Life Sciences swallows developed in truly interesting manner. On April 16, I saw my first birds, at the southeast corner of the building, and other campus bird-watchers reported having seen them a day or two previously. There were at the outset but few. My next notebook entry is dated April 25; then "at least a dozen" cliff swallows were actively constructing nests, wet mud in evidence, at the southeast corner of the building above the main entrance. The sites chosen were all in the duplicated squarish niches in the frieze or molding that extends almost continuously clear around the building. Note that this structural pattern is repeated on all four sides of the building, but that the first-arriving swallows chose the south side of the building, at the east end of that side.

After that date more and more swallows came. By May 12, when at 7:45 to 8:15 a.m. I made a count of the nests, I found that 128 pairs of the birds were present and established. The nests then varied all the way from the merest lower rim of wet mud to complete retorts. The most populous place was above the southeast entrance of the building, where most of the 48 nests there, were already completed.

In recording my census of nests, I made a diagrammatic plat of the building and entered the counts graphically. Dividing this diagram into four sectors, I found that the nests were clustered about three out of the four corners of the building. On the originally colonized southeast sector, there were 89 nests; on the southwest sector, 24; on the northeast sector, 15; but on the northwest sector, not a trace of a nest.

Of the 128 nests, all but 6 occupied sites in the rectangular niches of the frieze before mentioned—which is at the level, about, of the fifth floor of the building. The exceptional six were on irregularities of the cement wall, two of them above and four below, the level of the frieze. All of these off-level nests were in the southeast sector.

My next observations were on June 4, when a similar count taken showed the presence of 161 pairs of the birds, as represented each by a nest. It was notable that as compared with the census of May 12, all of the new sites had been chosen on the south face of the building. There were 52± of these new ones, the number indefinite because even at this date there were many mere rims. However, to anticipate, many of these rims were never carried forward to completion, as was also the case with some of those counted on May 15.

By this date, June 4, many nests had long been completed, and those in the metropolis, above the entrance to the building at the southeast corner, already, as presently to be evidenced, contained young. The frieze about the southeast entrance to the building was so much preferred over the seemingly identical sites elsewhere that every single one of the niches was occupied by a nest; indeed, two nests were crowded onto space immediately below the row of niches, and three or four, as previously indicated, on irregularities on the cement surface above.

Now a new factor of interest to us, and of serious import to the swallows, came into the picture. On May 27, I first became aware of the presence of English Sparrows (*Passer domesticus*). At the southeast corner of the building I saw males of this aggressive species behaving as if evicting cliff swallows from the latter's nests. Male sparrows, calling loudly, were either perched on the coping under the nests or were actually ensconced within the entrances to the swallows' nests. Furthermore, on the southeast steps at 1 p.m. of May 27, I found remains of eggs. On May 30, at 1 p.m., in the same location, I saw on the steps two dead young swallows of about hatching age, a splashed, incubated egg, and many fragments of eggshells—the latter definitely of the swallows because of the umber spotting on the shell fragments. Directly above, along the row of 48 swallows' nests, were several male English Sparrows. I did not see a sparrow actually pitch out a swallow's egg or young, but the evidence, though circumstantial, that they were doing so seemed to me at the time to be conclusive.

When I made the census of swallows' nests on June 4, I counted 11 English Sparrows, 7 of which were males perched on the coping near swallows' nests from which protruded wisps of nesting material; the birds were singing, if English Sparrows can be said to sing, as though sitting females were inside certain of the nests. Again and again, a sparrow was seen to enter a swallow's nest; but I did not see a swallow and a sparrow enter the same nest. On the southeast steps, I saw more, dead, naked, seemingly just hatched swallows, and also two more splashed eggs. The same sort of observations were made on June 5 and 6. On the latter date, sparrows were seen carrying

nesting material into swallows' nests at the southwest corner of LSB, so that all of the three corners of the building patronized by the swallows had also attracted sparrows.

By June 12, young cliff swallows began to be noted abroad. A nestling reported to be able to fly had been picked up from the ground north of LSB as early as June 2. The minimum interval for reaching this stage from the date of first arrival of the swallows was thus 48 days.

On June 26, 6:45 to 7:30 a.m., I again took count, both of swallows and sparrows. By that date, at most, a net number of 95 pairs of swallows were thought to have been successful; at least there were then 95 completed nests not occupied by sparrows. Additionally, many swallows' nests, most of those on the middle south side of the building, between the southeast and southwest entrances, had never been completed. Fifteen of the completed swallows' nests were on this date occupied by sparrows. A clue to successful occupancy of any nest by the swallows was afforded by the conspicuous whiteness of the rim of the bottleneck. This rim of whitewash, that is, excrement, indicated occupancy of the nest for some time by young swallows.

By this date, June 26, many young (I judged 45) were out of the nests, flying about or clinging along little ledges on the east and southeast faces of the cement walls, almost always in direct sunshine. The young swallows were being fed by old birds, either when the former were perched or when they were on the wing. Young were seen in some of the nest entrances, looking out. Then the silky whiteness of the throat, a color mark characterizing only the juvenal stage of plumage in this species, shone forth conspicuously against the blackness of the shadowed interior of the retorts, especially so where these were ensconced, as most were, in the deep recesses of the frieze. Possibly this white marking is an advertising or a directing device, facilitating quick and accurately aimed delivery of food to the young by the parents. The white-appearing brow-patch characterizes only the adults.

At this time, it was noted that some of the nests longest preëmpted by the sparrows had the bottle-neck broken out, with result that much of the dry grass and feathers accumulated inside by the sparrows protruded. At this date, June 26, I saw the first young English Sparrows out of the nests; adult sparrows were going to and from their nests or young along a south or southwesterly course, high above the lawns, as if patronizing a forage beat far beyond campus confines, in business sections of the city.

I was amazed at the aggregate large numbers of the English Sparrows around LSB, where before 1936 I could not recall ever having seen any, since its construction, in the summer time. Again we have illustrated how the fortunes of one kind of animal may be influenced favorably by some circumstance in the economy of another. The swallows, by furnishing appropriate nest sites, brought the sparrows into a territory new for them. Partial supplantation, or succession, was in evidence.

On June 28, at 2:15 p.m., at one moment, I counted 29 young cliff swallows clinging in the countersunk letters of the word "bacteriology" at the southeast corner of LSB. Then, a certain nasal note from adult swallows in flight out in front of the wall, sent these and other young in the vicinity simultaneously off into a swirling flight southward over the lawns, some of them out of sight over the town, presently to return—practice flights, I guessed.

On July 4, at 1 p.m., I counted 105± young swallows clinging to ledges or perched in recesses of the two walls of the building at the southeast corner. All were toward the top above the level of the frieze harboring the nests. All but a very few of the successful nests had now yielded their broods; and there was notably less litter on the steps beneath the main mass of nests—which steps had been swept and hosed by the janitors at least weekly.

By July 10, practically all of the young swallows had swarmed entirely off the campus; and but a very few adults remained. Possibly 10 pairs were still visiting nests on July 20, at the southeast corner, and 2 pairs at the southwest corner of the building. On July 23, fully a dozen young swallows, possibly of second broods though more likely of late-nestings, of retarded pairs, were seen out and clinging along ledges above the level of the nests. On July 26, a circuit of the building at 9:20 a.m. showed not a swallow in sight or sound in any direction. No excrement or litter, either, was detected on the regularly swept steps at the three swallow-occupied corners of the building. There were still a few English Sparrows about. I concluded that this season's chapter of the story of the swallows was closed.

But on July 29, I saw two to four adult swallows visiting nests elsewhere than directly above the entrance steps, though in niches that were near by. On August 4 I saw one adult. On August 10 I saw two adults flying about the southeast corner—not attentive to any one nest. And that was my last date for any swallow whatsoever. No young had been seen since July 26.

The total period of presence of Cliff Swallows at the Life Sciences Building, April 16 to August 10, was 117 days, close to one-third of a year. But the greatest numbers of the birds were present only from about May 1 to July 10, 71 days or but one-fifth of a year. In that space of time, nests were built, eggs incubated, and young launched.

Although at least 161 pairs of swallows essayed to nest on LSB, for various reasons only about 95 pairs succeeded in bringing off broods. Figures as to numbers in broods are entirely lacking; but judging from numbers of young abroad at launching times I estimate the total production of full-grown young in the year 1936 at about 190, or 2 per pair of adults, or 100 per cent net ratio of reproduction.

One of the questions brought up by this narrative is suggested by the directional "exposure" chosen by the swallows on this perfectly symmetrical building. This selected exposure is *southeast*ward; it was that exposure that was chosen by most of the few firstcomers, in 1935, and the same exposure marked the greatest concentration of nests in 1936. While the northeast and southwest segments of the building supported also a few nests, the opposite, *northwest* segment has not, to my knowledge even been "prospected" for a nest site by any pair of swallows. Yet structural conditions on all sides of the building would appear to the human eye identical.

As to the determining factors for predominant southeast choice, I can only speculate. They may have to do with warmth in the early part of the day when, my impression is, most of the nest-building is done. Quick-drying, and hence more certain adhesion, of the mud may be favored on the exposure toward the warm morning sun. Then, the light-factor may figure; *if* the diurnally-adapted swallows do most of their nest-building in the forenoon, that would mean better views of the work in progress in the shaded niches, and within the growing mud-walled retorts themselves; also, the openings of the nest entrances in direction toward the brightest segment of the sky may be most favorable during the period when young in the nest are being fed.

Direction toward main source of mud during the nest-building or, rather, nest-starting period *might* be a factor, as also a direction toward more or less distant daily forage areas. But I am unable to offer any observations of positive bearing on these theories. That the swallows arrive in the spring *from the southeast,* presumably, and hence first inspect potential nest-sites from that aspect suggests another hypothesis—but this idea seems pretty tenuous!

So, let us keep watch of the swallows at the Life Sciences Building, keeping record of the history of this newly established colony. How long will it prosper? Here we have a total of close to 1500 linear feet (over a quarter of a mile) of nearly uniform cliff-face,

part of which has proved itself adapted to these birds' nesting needs. There is no immediate dearth of space, even if already used surface be not so good for attachment of new nests. Barring human-caused catastrophe, what will be the course of events?

Thinking back through the years, depending upon memory to be sure, because of my failure to make written record of detailed observations in this particular matter, I cannot recall any relatively permanent cliff swallow colony, either on rock surfaces or on buildings. Colonies have come and gone. Two or three years of occupancy of any one exact site has seemed to be the limit. In each instance, favorableness of any given site was outlived and the "rancheria" transferred to some new site.

Is the factor for this periodic limitation of colony site something having to do with nest construction—like deterioration of surface? Or has it to do with accumulation of invertebrate parasites about the nests? Or has it to do with increasing predation upon the swallows, young and old, by other birds, past a point of racial endurance? Or has it to do with exhaustion of vitally necessary food elements within the cruising radius of the foraging swallows? Or, finally, may it not be an intrinsic factor, in that young of each succeeding generation are led inherently to establishment of new, separate nesting sites, with the result that each colony site is occupied only as long as the lifetime of a generation of swallows?

I am tempted here to think of other colonial animals. Are not all or most of such, limited in their length of tenure of any one spot of ground? Prairie dog towns wax and wane; but ever, new ones spring up on new sites. Exhaustion of resources, or contamination of habitation, causes progressive shifting. In human history, the phenomenon is common; cities rise and fall, their sites presently to be marked only by fragments of bricks. And maybe the fundamental ecologic factors are pretty much the same as in the "Republican Swallows," as they were called by Audubon in 1824, whose former village sites are to be ascertained only by looking for traces of the little mud "bricks".

If someone in temporal authority, stimulated by a zealous impulse to preserve formality and tidiness on the campus, be not led to drastic action *un*favorable to the continuance of this present experiment in nature, we bird-watchers will have opportunity to see happen significant things for the understanding of cliff swallow natural history.

Museum of Vertebrate Zoology, Berkeley, California, March 17, 1937.

BIRD LIFE AT TWENTYNINE PALMS

WITH THREE ILLUSTRATIONS

By FRANCES CARTER

An oasis providing abundant water and shade in the midst of a vast arid region is an ideal place for observing bird life. Such is the oasis at Twentynine Palms, San Bernardino County, California. It is situated within the southern border of the Mohave Desert at an elevation of 2100 feet, about 50 miles northeast of Palm Springs, and 60 miles from Banning, Riverside County. The community, which takes its name from an historic group of Washingtonia palms, is widely scattered over a broad valley, surrounded by the Little San Bernardino, Pinto, Sheep Hole, and Bullion mountains. In recent years, its popularity as a resort has led to rapid development, and certain areas are now thickly settled.

The narrow strip of oasis, running along the southern side of the valley for about three-quarters of a mile, is interrupted near its center to form two distinct parts. The

eastern half, locally known as "the palms", is conspicuous for the group of tall palms, now reduced by fire and storm to 23. There are also large cottonwoods and a dense growth of the honey, or straight podded, mesquite. Several springs or waterholes provide excellent vantage points for the observer of birds.

The western half (see fig. 58), site of the 29 Palms Inn, contains many small palms, as well as much cottonwood, willow and mesquite. Here the water from numerous springs overflows to form nearly 5 acres of grassy swamp, at one time used for pasturing horses. In places there are beds of tules and of sedge. Two principal pools, where considerable water has collected, will be referred to in the accounts of species as the corral pool and the pasture pool (see fig. 59).

Fig. 58. The western branch of the oasis, location of the Twentynine Palms Inn; Little San Bernardino Mountains in the background.

The outlying region is a detrital plain, intersected by dry washes and covered with creosote bush, various species of salt bush, some cactus, mostly of the cholla group, and other desert growth of the low, scrubby type. It rises gradually on the south to the base of the mountains, tumbled rock piles with vegetation interspersed. There is probably a fairly distinct avifauna characteristic of each of the three habitats: mountain, open plain and oasis. My observations were confined almost exclusively to the oasis, and principally to the western part, adjoining the 29 Palms Inn.

The most striking feature of the bird population of the oasis, and an advantageous one from the observer's standpoint, was the large number of species representing several of the major families. Ten flycatchers, 6 Icteridae, 11 wood warblers, and 5 Turdidae facilitated comparison and contrast. Another example was the presence of 3 goldfinches and the Pine Siskin during the fall months. And the concentration of species in that favorable habitat is well shown by the identification of 95 species, with numerous others unidentified or doubtful.

The periods covered by my observations were from December 30, 1933, to May 17, 1934, and from October 17, 1934, to May 30, 1935. It may well be noted that these observations were largely of casual nature, the most outstanding occurrences of each species which came to my attention. Regular, careful survey of the whole area would

probably have disclosed far greater abundance of the more retiring species. These are, too, almost entirely field identifications and so less valuable than records of collected specimens. However, observations were made with the greatest possible care, and a number of doubtful records have been eliminated from this account. Some species, as noted below, were trapped for banding and so permitted of identification in the hand. There is no attempt to distinguish subspecies.

Common Loon. *Gavia immer.* On November 11, 1934, a loon in winter plumage was found exhausted by the roadside nearly 5 miles from water. It was brought to the oasis and placed in the pasture pool. On the following day it seemed quite revived, although still permitting close approach. It swam freely and dived, uttered a low chuckling sound and also a high quavering "laugh." Was not seen again.

Eared Grebe. *Colymbus nigricollis californicus.* An adult in full breeding plumage was seen in the pasture pool, April 16, 1935.

American Egret. *Casmerodius albus egretta.* This conspicuous snow-white bird, at the oasis April 23, 1935, aroused much interest among even the most casual observers, as it stood stiffly among the dry bushes, or flew with slow, graceful strokes of its huge wings above the green of the swamp. Seen also April 24.

Anthony Green Heron. *Butorides virescens anthonyi.* A single individual, seen in the pasture pool, May 9, 1934, was still present May 14. Reported in tules February 8, 1935. One recorded May 1, 5, 6, and 13.

Green-winged Teal. *Nettion carolinense.* A single individual, reported first by a reliable observer January 29, 1935, was seen February 10 and 17.

Cinnamon Teal. *Querquedula cyanoptera.* March 22, 1934, flock of 9 (5 males, 4 females) in corral pool. Seen March 23. Four seen in pasture pool March 24. For 1935, there are records only of a female, March 22 and 25, and of a male in the pasture pool, April 10 to 16.

Merganser. *Mergus,* species? April 22, 1934. Flock of about 30 mergansers alighted on corral pool at noon, apparently very tired. Had already left early the next morning.

Turkey Vulture. *Cathartes aura.* Seen intermittently during the whole period, either singly or in flocks. Flock of 29 counted April 3, 1935.

Sharp-shinned and Cooper hawks. *Accipiter velox* and *A. cooperii.* Both present; not always distinguished. Recorded April 21, 1934. On May 14, one, probably *A. velox,* took 3 newly hatched Say Phoebes from a nest under the eaves of the Inn porch. On November 4, 1934, a larger hawk, presumably the Cooper, swooped to the ground and caught a Fox Sparrow. A sharp-shinned was identified in flight, February 16, 1935.

Western Red-tailed Hawk. *Buteo borealis calurus.* Pair observed circling, January 12, 1935. Occasionally seen thereafter.

Sparrow Hawk. *Falco sparverius.* Clearly viewed on fence post, April 4, 1934. Subsequently heard from time to time.

Gambel Quail. *Lophortyx gambelii.* Heard at the palms, March 16, 1934. Flocks seen at water overflow behind the Inn pump house, in the early mornings around May 15, 1934. Had previously been reported from surrounding country. None observed at the oasis up to June 2 in 1935.

Killdeer. *Oxyechus vociferus.* Common about the swampy parts of the oasis; possibly resident. From early March on, Killdeers were heard frequently at night, especially around full moon, when they might be seen circling about, crying noisily. Present October 17, 1934; seen daily. During March, 1935, small groups were often seen circling over open desert, calling loudly and occasionally alighting. Courtship behavior was observed during March, 1934, and April, 1935. No search for nests was made.

Wilson Snipe. *Capella delicata.* A single snipe was seen probing among weeds at the edge of the swamp, October 30, 1934. One was seen March 18, and two March 23, 1935. One seen March 25 was followed and flushed from various parts of the swamp. Two were recorded March 27, and one April 2, 3, and 12.

Greater Yellow-legs. *Totanus melanoleucus.* One was seen in the swamp March 18 and April 10, 1935.

Least Sandpiper. *Pisobia minutilla.* Three were seen probing in the swamp, March 7, 1935. Occasionally they stopped to rest in the sun, sometimes even tucking the bill back between the wings. One recorded April 12.

Mourning Dove. *Zenaidura macroura.* The first record is of a single individual near the Inn, April 9, 1934. Mourning Doves were frequently seen and heard thereafter. They were particularly

numerous around May 9, and still present May 17. A Mourning Dove was heard at sunset, April 11, 1935. Two were seen May 1, 6 on May 5, about 12 May 6, and many more May 9. They were still quite numerous May 31.

White-winged Dove. *Melopelia asiatica mearnsi.* A White-winged Dove was trapped and banded on May 12, 1934. Several were seen thereafter; their calls often heard in contrast to the more familiar notes of the Mourning Dove. In 1935, their calls are recorded in the early morning, May 10, 17, and 27. A fuller account of this record has appeared in the Condor (vol. 39, 1937, p. 85).

Screech Owl. *Otus asio,* subsp. An individual was clearly viewed while perched on a wire under a cabin porch light, January 26, 1934, and another on February 27, 1935.

Horned Owl. *Bubo virginianus,* subsp. One was seen on a fence post near the corral, at dusk, November 6, 1934. The following day, it was found roosting in a large willow near one of the cabins. It was seen in a dead treetop on November 11.

Saw-whet Owl. *Cryptoglaux acadica.* One found dead, near cabins of the 29 Palms Inn, January 23, 1934. The carcass was deeply buried in leaves, completely desiccated, and partly eaten away. It is preserved as a skeleton, with part of plumage, in the Museum of Vertebrate Zoology.

Poor-will. *Phalaenoptilus nuttallii,* subsp. During April and May, 1934, the call of the Poor-will was frequently heard at night, seemingly from a great distance. In October, an individual was often seen after sundown, squatting in the dusty path near the cabins and darting up after insects. It was silent at this time.

Texas Nighthawk. *Chordeiles acutipennis texensis.* Identified April 17, 1934, swooping low over the croquet court, about sunset. Never more than one or two were seen. Also noted on May 26, 1935.

Costa Hummingbird. *Calypte costae.* A male was seen March 13, 1934, on blooming bladder-pod (*Isomeris*) on the desert, and another at the palms on March 16.

Belted Kingfisher. *Megaceryle alcyon.* A single individual flew with rattling cries from one to another of the tall trees of the oasis, April 9, 1934. Also recorded April 20 and 28. In 1935, the kingfisher was first heard March 31, subsequently April 2, 4, and May 9.

Red-shafted Flicker. *Colaptes cafer collaris.* Apparently a common winter visitant. Seen and heard daily from December 30, 1933, till around March 27, 1934. Present October 16, 1934; fairly numerous, often 2 or 3 together. Seen or heard until April 3, 1935.

Cactus Woodpecker. *Dryobates scalaris cactophilus.* One record, January 19, 1934; a single individual seen on the trunk of a large willow near the Inn.

Western Kingbird. *Tyrannus verticalis.* Identified March 23, 1934. The species was not always distinguishable in the field. *T. verticalis* was recorded April 18 and 20. Kingbirds were still present May 17. In 1935, records of *Tyrannus* (species?) occur throughout March, April, and May. The Western is definitely recorded: 2 individuals March 30, April 3, 4, and 5; one intermittently from May 6 to June 2.

Cassin Kingbird. *Tyrannus vociferans.* Definitely recorded April 2, 11, 12, and May 5, 1934. Nesting observed from May 21 to June 2, 1935.

Ash-throated Flycatcher. *Myiarchus cinerascens.* Identified May 10, 1934. Several individuals were seen daily until May 17. There are no positive records at the oasis during the spring of 1935. On June 2, 1935, a nest of the species was observed on the Wm. H. Campbell property, about 2 miles north of the oasis. The nest was built within a gate post pipe, 14 inches below the top. The pipe measured 6½ feet in height and 3½ inches inside diameter. The nest contained one bird, probably not less than a week old, and 3 unhatched eggs. Report came from W. E. Ketcham of 29 Palms that a second clutch of eggs was literally cooked by the summer heat.

Black Phoebe. *Sayornis nigricans.* First observed February 24, 1934. One individual was seen almost daily until April 4. For 1935 the first recorded date is February 23, although the bird was possibly heard previously. Records continue throughout February, 2 birds being observed on the 28th. These were quite vocal, uttering in addition to the characteristic single-syllabled call, a number of more elaborate notes similar to those of the Say Phoebe, but having a reedier quality. Records of one or two individuals appear daily until April 12.

Say Phoebe. *Sayornis saya.* A common resident of both the oasis and the surrounding desert. The breeding song was heard continually from early February on. Eaves of buildings were apparently a favorite nesting site. Residents of the valley reported that 2 broods are usually hatched, but that the second often perishes from the heat, in spite of their attempts to provide shelter.

Western Flycatcher. *Empidonax difficilis.* First seen in cottonwoods, April 22, 1934. Seen and heard April 27 and 28, May 1 and 6. Probably not more than two individuals. A single Western Flycatcher was seen May 30, 1935. Identified only by note April 2, 3, 4, and 9.

Western Wood Pewee. *Myiochanes virens richardsonii.* Identified May 7, 1934, heard several

days previously. Seen daily in considerable numbers, perhaps a dozen. Still present May 17. First recorded in 1935 on April 15; subsequently, May 5, 17, 21, and daily until May 31. Only 3 individuals, quite vocal.

Olive-sided Flycatcher. *Nuttallornis borealis*. One record, May 24, 1935.

Vermilion Flycatcher. *Pyrocephalus rubinus mexicanus*. The appearance of this gorgeous little flycatcher never failed to arouse great interest. A single one was observed in the mesquite bordering the swamp, March 22, 23, and 24, 1934. In 1935, 3 individuals, distinct in markings, were seen at different times. An especially brilliant bird appeared February 22 and was recorded daily through February 27. One less brilliant, with underparts tinged with gray, was seen March 24. On April 3, one was noted with grayish belly set off from vermilion breast in almost as distinct a pattern as that of the Black Phoebe. In contrast with the silence of the others, this one was very vocal, uttering a rhythmical song while fluttering in the air. Seen and heard April 4 and 5.

Fig. 59. The pasture pool, occasional resting place of migrating waterfowl. A Loon may be seen at the far edge of the pool.

Cliff Swallow. *Petrochelidon albifrons*. Single specimen found dead near Inn, May 8, 1935.

Raven. *Corvus corax sinuatus*. Two seen flying over desert area bordering oasis and alighting on fence, May 5, 1935. Low calls heard.

Verdin. *Auriparus flaviceps*. Apparently resident. Identified January 5, 1934. Old nests commonly found in smoke trees and mesquite. Pair seen building new nest in mesquite by west boundary fence of the Inn property, March 21, 1934. Verdins were seen and heard at both branches of the oasis during fall and winter, 1934. Their notes were recorded continually after January, 1935. New nest discovered nearly complete, March 25, 1935, about 3 feet from that of previous year.

Western House Wren. *Troglodytes aëdon parkmanii*. Single individual captured in W.B.B.A. sparrow trap and banded, April 26, 1934. Not seen outside of trap.

Marsh Wren. *Telmatodytes palustris*, subsp. Common in tules and sedge about the oasis; rarely seen clearly. Identified January 26, 1934. Song heard frequently around March 8; singer invariably hidden. Scolding note heard October 25, 1934, and thereafter throughout the winter. November 7, singer glimpsed long enough to verify identity. Apparently nesting in sedge around February 5, 1935. Used combings of dog's hair for lining. Partial nests of palm fiber found. During this time, singing of many individuals was almost continuous. Song recorded until April 5. No young birds seen, and no further evidences of nesting.

Rock Wren. *Salpinctes obsoletus*. Identified near engine house of Inn, November 6, 1934. Probably more common in surrounding desert.

Western Mockingbird. *Mimus polyglottos leucopterus*. Not so common as might be expected. Did not come close to buildings but remained in mesquite at far western end of the oasis. Song heard April 22 and 28, 1934. Observed closely November 18, 1934. Seen January 18, 1935. Recorded throughout February, sometimes 4 together. Song heard all during March. Still present May 24.

Leconte Thrasher. *Toxostoma lecontei.* Although not seen at the oasis, the Leconte Thrasher deserves mention as a bird typical of the surrounding desert. One nest with young just hatching was observed by Derald Martin in a cholla cactus, April 15, 1934, in the sand dunes of the northern side of the valley. Pairs were frequently reported near homes of residents, and the song might be heard in the dry mountain canyons.

Sage Thrasher. *Oreoscoptes montanus.* Identified January 29, 1934. Quite numerous. Frequented mesquite near boundary between oasis and desert. Recorded intermittently during February, and still present March 24. In contrast to the relative abundance of this species during the winter and spring of 1934 are the few scattered records of one or two individuals, seen at the palms December 11, 1934, and January 7, 1935. Repeated search failed to reveal any Sage Thrashers at the western branch of the oasis.

Western Robin. *Turdus migratorius propinquus.* Occasional migrant. Recorded January 26, 1934, near overflow from abandoned well. Large flock at well February 25. Fall migrants heard in early morning, October 29 and 30, and November 5, 6, 7 and 14. One seen December 8, flock of about 6 December 9. Reported January 30, 1935. Seen and heard intermittently, usually 2 or 3 together, throughout February and March. Last record April 12.

Hermit Thrush. *Hylocichla guttata,* subsp. Observed only by chance, in underbrush and near water. Single individuals recorded March 21 and 31, and April 2 and 3, 1934. Only records for 1935, April 16 and May 5.

Russet-backed Thrush. *Hylocichla ustulata.* Arrived May 14, 1934. Frequently heard. Still present in considerable numbers May 17. First definite record for 1935, May 7. Not very numerous; scattered records during May. Still present May 30.

Western Bluebird. *Sialia mexicana occidentalis.* Large flocks of bluebirds, feeding on the berries of a mistletoe (*Phoradendron californica*) in the mesquite, made a striking spectacle, January 18, 1934. Seen daily thereafter, numbers gradually decreasing. Last definite record, March 1. First fall record, November 10. Small flocks seen, notes heard, throughout November, December, and January. On January 22, 1935, a flock of perhaps 50, containing both Western and Mountain bluebirds, the latter more numerous, was observed near the palms, flying down from the cottonwoods to the desert floor. A flock of about 25 was seen at the palms January 27. Records of smaller flocks continue throughout February and March, dwindling to a solitary female seen from March 20 to 28. Two males and one female on March 29 were the last observed.

Mountain Bluebird. *Sialia currucoides.* A few brilliant individuals were conspicuous among the flocks of Western Bluebirds seen January 28, 1934. In pasture March 7. Single female seen March 24. A few were seen with the Western Bluebirds on November 16 and 18. The greatest numbers were seen in the mixed flocks, January 22, 1935, noted above. On January 25, about a dozen were seen at the Inn. February 9, several were seen with Western Bluebirds in the open desert, catching insects. Scattered records end with a single female March 7, 10 and 13.

Western Gnatcatcher. *Polioptila caerulea.* Observed in mesquite at the palms, March 18, 1934. Probably more common than single record would indicate.

Ruby-crowned Kinglet. *Corthylio calendula.* Two individuals in willows near Inn, January 10, 1934. Seen a few times subsequently. One seen October 20, 26 and 27. Pair seen October 31; crown of male conspicuous. Records fairly regular throughout winter. Four seen together February 25, 1935. Last record, April 9.

Pipit. *Anthus spinoletta rubescens.* Flock seen near Inn, October 31, 1934. One seen November 11. Reported by Mr. Laidlaw Williams, January 18, 1935. One seen in pasture February 28.

Cedar Waxwing. *Bombycilla cedrorum.* Occasional. Flock at the palms May 7, 1934. Small flocks seen and heard about Inn. Still present May 17. Small flock present October 17 to 31. Six seen November 4. Flock of about a dozen seen March 1, 1935. March 3, 8 or more; March 8, at least 17. Recorded April 14 to 16, May 12, and May 24 to 27.

Phainopepla. *Phainopepla nitens.* A picture characteristic of the region is a group of these glossy birds, with their white wing patches, flying up from the tops of the mesquites to catch insects and uttering a muffled note which comes to be closely associated with the scene. They were seen almost daily during the early part of 1934. By May 7, only a few pairs remained, which suggests the possibility that some individuals migrate, while others remain to breed. They were not very plentiful October 17, but were seen often by November 7. Numerous at the palms December 11, and seen all during winter and spring. On May 23, 2 fully grown young were seen in the top of a cottonwood, still being fed by the parents.

Shrike. *Lanius ludovicianus,* subsp. Identified January 14, 1934. Seen in considerable numbers around April 20, often perched on vertical stems of tules. Present October 30. Records not kept thereafter.

Cassin Vireo. *Vireo solitarius cassinii.* Characteristic "Jimmy, c'm'ere" song heard March 24, 1934. Heard April 12, 13, 14 and 17; singer never seen. First heard on April 2, 1935. Heard April 3; seen and heard May 7, heard May 9, 12 and 17. Probably a casual spring migrant.

Western Warbling Vireo. *Vireo gilvus swainsonii.* Song heard April 12, 1934. Seen early in May; heard May 6. First seen April 4, 1935, song heard May 8. Glimpsed long enough for identification May 10, heard May 12 and 24.

Lutescent Warbler. *Vermivora celata,* subsp. Identified February 24, 1934. Frequently seen in willows all during spring; last dates April 22 and 26. Single doubtful record, March 28, 1935.

Yellow Warbler. *Dendroica aestiva,* subsp. Identified April 28, May 2, 3, and 4, 1934, and May 13, 1935.

Audubon Warbler. *Dendroica auduboni.* Very common winter visitant. Seen January 26, 1934. Present in considerable numbers during February, March, and April. On April 17, a male was observed to be in full breeding plumage. Last date, April 22. Present October 22. Two or 3 individuals often seen at once in fall and winter months. Recorded as present in flocks March 18, 1935. On that date, 4 Audubon Warblers were observed feeding in the swamp, in company with 8 Gambel Sparrows, one White-crowned Sparrow, one Lincoln Sparrow and 2 Savannah Sparrows. Last date, April 12.

Black-throated Gray Warbler. *Dendroica nigrescens.* Single male identified in willows beside the Inn, April 24, 1934.

Townsend Warbler. *Dendroica townsendi.* Identified April 30, 1934; recorded intermittently until May 17. Only one or two present, remarkably tame. One feeding on the lawn at the Inn could be approached within 2 or 3 feet. No records for 1935.

Hermit Warbler. *Dendroica occidentalis.* Several present in willows at the Inn, April 22, May 2 and 3, 1934.

Tolmie Warbler. *Oporornis tolmei.* Seen only May 11, 12 and 14, 1934.

Yellow-throat. *Geothlypis trichas,* subsp. A shy inhabitant of the sedge beds; infrequently seen. Recorded April 24 and 26 and May 4, 1934. First seen in 1935 on March 25, and thereafter on March 31, April 3, 10, 15, 26, May 5, 13, and 21.

Long-tailed Chat. *Icteria virens longicauda.* On May 1, 1934, two appeared in the W.B.B.A. government sparrow trap under a willow thicket and were banded. Another, banded May 2, repeated daily until May 10. A fourth was banded May 6. These individuals were silent and were not once seen outside the trap. On May 1, 1935, loud bursts of song were heard, and on May 12 the singer was seen and identified as the Long-tailed Chat. Recorded May 13 and 17.

Pileolated Warbler. *Wilsonia pusilla,* subsp. First seen April 22, 1934. Large numbers present April 23. Recorded continuously until May 14. Often watched in mesquite outside cabin windows. The species was seen April 12, 1935, recorded as numerous April 16, and subsequently throughout May.

Redstart. *Setophaga ruticilla.* One record, May 28, 1935. A female or young male was seen, spreading its tail so that the areas of yellow at the base were displayed as it moved about the willow trunks.

English Sparrow. *Passer domesticus.* It is even necessary to mention the presence of the English Sparrow. During the spring of 1934 it made itself unpopular by appropriating or destroying nests of the Say Phoebe under the eaves of the Inn porch. Flycatching habits were observed, as a sparrow would sometimes rise from the ground to pursue a moth for some distance through the air and finally capture it.

Western Meadowlark. *Sturnella neglecta.* Seen January 5 and 12, 1934. Song heard February 21, April 18. Seen May 14. Reported as present also in dry parts of the valley. Present in considerable numbers October 17. Seen daily about the Inn; very tame. Recorded until November 27; next record March 7, 1935.

Yellow-headed Blackbird. *Xanthocephalus xanthocephalus.* A few were conspicuous among the flocks of Red-winged Blackbirds in the tules and mesquite near the Inn, May 2 and 4, 1934.

Red-winged Blackbird. *Agelaius phoeniceus,* subsp. In swamp March 23, 1934. Seen intermittently, song frequently heard. Flock of about 12 recorded April 18. Still present May 17. Present October 25, numerous November 7. No further records until a single male was seen March 7, 1935. Increased numbers present by May 6, still present May 31. While horses were being pastured in the swamp, red-wings were sometimes seen close behind a horse's muzzle, ready to snatch whatever might be uncovered as a tuft of grass was pulled up.

Arizona Hooded Oriole. *Icterus cucullatus nelsoni.* A male was captured for banding May 2, 1934, in a Potter trap baited with slices of orange, placed on a small platform in a mesquite near the Inn. Later the same day a female was trapped. The song of this species became a characteristic

sound of the early mornings in May. The first record for 1935 is of a pair seen April 15. On April 26, the song was heard, and several variations, seemingly uttered by the same bird, were often heard thereafter. A female was seen May 16, 21 and 23, and the song was still heard May 27. Although no evidences of nesting were observed during these two seasons, old nests, presumably of this species, were found in palms near the Inn. They were constructed entirely of palm fiber and each was enclosed within the curve of the under side of a dried frond which hung close to the trunk.

Scott Oriole. *Icterus parisorum.* Handsome pair seen near a waterhole at the palms, May 7, 1934. On May 10, a female was trapped and banded near the Inn.

Bullock Oriole. *Icterus bullockii.* Bullock Orioles were first seen in the cottonwoods at the Inn, April 1, 1934. They were frequently seen and their ludicrous songs heard daily after that date. Between April 27 and May 8, 3 males and 7 females were captured and banded in the trap described under the preceding species. Two of this species appeared March 14, 1935. The song was heard March 29, and thereafter records are practically continuous until May 31. Old nests of the Bullock Oriole, woven of palm fiber, were swung from dependent branches high in the cottonwoods. A pair might sometimes be seen inspecting these old nests or apparently selecting new sites but no new building was observed.

Western Tanager. *Piranga ludoviciana.* A male was seen April 28, 1934, and thereafter several individuals were seen daily. They were almost absurdly tame and might be approached within a few feet, on the paths among the Inn cabins. Four tanagers were trapped, and banded, in the Potter trap on May 12 to 14. These included 2 adult males, one female, and a young male lacking the red on the head. This last bird apparently acquired a passion for grapefruit and was removed from the trap 6 times on May 14. In 1935, tanagers appeared a few days previous to April 13. They seemed not quite so numerous or so tame as those of the year before but were observed almost daily throughout May.

Rose-breasted Grosbeak. *Hedymeles ludovicianus.* Derald Martin, Boy Scout and reliable observer, reported the occurrence of a Rose-breasted Grosbeak near a waterhole at the palms, May 13, 1934. This observation is interesting in view of the fact that there is a specimen from Palm Springs, in the Museum of Vertebrate Zoology.

Black-headed Grosbeak. *Hedymeles melanocephalus.* A female was seen April 24, 1934. Fifteen individuals, including 6 adult males with black heads, 5 younger males and 4 adult females, were banded between May 6 and 14. They bit viciously and had to be handled with great care, but some became inveterate "repeaters." Chicken feed, citrus fruit, and water were all accepted as bait. The species was still present May 17. There are few records for 1935, probably because no trapping was done, and most of the birds of the previous year were seen in the trap. Dates recorded are May 8, 12, and 30. An interesting return report was received. One of the young males, banded May 12, 1934, was found dead at Battle Mountain, Nevada, about 500 miles due north of 29 Palms, on May 18, 1935.

Blue Grosbeak. *Guiraca caerulea.* The gorgeous Blue Grosbeak was recorded almost daily from May 7 to 17, 1934. The birds were exceedingly wary, flying for cover at the slightest warning of the observer's presence. A few individuals were watched through a window early in the morning, as they cracked large grains of scratch feed scattered in the path the night before. No records for 1935.

Lazuli Bunting. *Passerina amoena.* First date, April 17, 1934. On May 2, several started up from the deep grass with a flock of Chipping Sparrows, and that association was regularly noted thereafter. Considerable numbers were observed May 6, and the species was still present May 17. There is but a single doubtful record for 1935, May 6, with a possible record of the song May 13. Whether the fact is of any significance in this connection, no Chipping Sparrows were seen in 1935.

California Purple Finch. *Carpodacus purpureus californicus.* From November 4 to 18, 1934, Purple Finches were seen in considerable numbers with the large flocks of goldfinches then present. The song was rarely heard, only a brief, warbled call note and the sharp "pit-pit" uttered in flight. On November 18, a female was seen perched on the top of a cage containing a young male canary, as it hung from the eaves of the Inn porch. The song of the California Purple Finch was heard in the early mornings April 2, 5, 9, and 13, 1935.

House Finch. *Carpodacus mexicanus frontalis.* Apparently resident; observed December 30, 1933, and daily thereafter. During May, 1934, they began nesting in the palm trees. They were present on October 17, 1934. By January 27, 1935, their singing was heard regularly in the early mornings, and during March and April it took a prominent place among the songs heard throughout the day. Fledglings were apparently being fed May 13.

Pine Siskin. *Spinus pinus.* On May 12, 1934, a few Pine Siskins were seen with the Green-backed Goldfinches on the beds of yellow composite. A single individual was seen with the Lawrence and Green-backed goldfinches October 30, 1934. Siskins were then recorded almost daily until November 21. Their notes were heard December 19. There is one record for 1935, May 7.

Willow Goldfinch. *Spinus tristis salicamans.* Identified November 23, 1934. A flock of about 12 was feeding on the ripe seeds of a plant rejoicing in the name of "jackass clover." These were present until December 3. On December 12 and 13, a smaller flock was noted, while for the following 3 days only 3 individuals were recorded.

Green-backed Goldfinch. *Spinus psaltria hesperophilus.* These goldfinches were present December 30, 1933. Around April 27, 1934, flocks of 2 or 3 dozen frequented beds of a small yellow composite in the swamp. When disturbed, they would fly up and arrange themselves in rows along the strands of a barbed wire fence, only to drop down again as soon as the observer was quiet. They were still present May 17. Small flocks were seen daily in the "jackass clover" from October 17 to November 15, 1934. On November 1, a female of this species was seen on the cage of a young male canary, and great mutual interest was exhibited. The next record is of the song, February 19, 1935, and March 23. On March 30, 11 were perched in a cottonwood in a strong gale, singing loudly. Records continue throughout April and May, but there were not the large flocks seen the previous spring.

Lawrence Goldfinch. *Spinus lawrencei.* Several identified among the Green-backed Goldfinches, October 17, 1934. They were seen daily until October 30 and heard frequently until November 14, after which they were apparently replaced by Willow Goldfinches. Their light, twittering note was recognized as that occasionally heard, but not identified, during the spring. Notes of this species were heard intermittently from March 23 to May 26, 1935.

Savannah Sparrow. *Passerculus sandwichensis,* subsp. Identified in the swamp March 24, 1934. Recorded April 18, and at the palms May 7. Savannah Sparrows are recorded intermittently from February 9 to April 5, 1935. On the latter date, they were seen bathing in tiny puddles of water in the swamp and flying up into the mesquite to dry.

Desert Sparrow. *Amphispiza bilineata deserticola.* Seen at the west end of the oasis March 21, 1934; at the palms May 7. A remarkably tame Desert Sparrow was seen about the Inn almost daily from March 12 to 24, 1935; also recorded April 1 and 4, and May 23.

Sage Sparrow. *Amphispiza nevadensis,* subsp. Tentatively identified January 29, 1934. Reported by Mr. Laidlaw Williams January 18, 1935. Probably more common than these records indicate.

Junco. *Junco oreganus,* subsp. A single junco was seen in the deep grass beside the Inn, March 2, 1934. Small flocks of juncos were occasionally surprised at Split Rock and Seven Pines, favorite picnic spots in the Little San Bernardino range, but never more than a fleeting glimpse was obtained.

Fig. 60. A corner of the lake at Barker's Dam.

Chipping Sparrow. *Spizella passerina,* subsp. First seen on the lawn at the Inn, March 24, 1934. Thereafter they were present in large numbers about the oasis, apparently filling the niche left vacant by the migrating Gambel Sparrows. From May 2 to 4, 5 were trapped and banded in the Potter trap. Still present May 17.

White-crowned Sparrow. *Zonotrichia leucophrys leucophrys.* A single one was trapped and banded, with several Gambel Sparrows, at the palms, March 16, 1934. On May 14, one was identi-

fied through field glasses at close range, near the Inn, long after the migration of the Gambels. On March 3, 1935, an immature bird with definitely dark lores was trapped near the Inn.

Gambel Sparrow. *Zonotrichia leucophrys gambelii.* A winter visitant, present in large flocks. Between February 2 and March 27, 1934, 54 individuals were trapped and banded in various parts of the oasis. Observations were then interrupted, and the date of emigration was not determined; but Gambel Sparrows were no longer present when trapping was resumed on April 24. Dates of arrival for the fall of 1934 were rather late. A single immature was seen October 23, and 2 or 3 individuals October 30. A small flock was reported at the palms November 17. By February 9, 1935, large flocks were present. In April the song was heard continuously, and the last record is of the song heard in the pasture May 6.

Fox Sparrow. *Passerella iliaca,* subsp. November 4, 1935, a Fox Sparrow, of the type with gray head and back, was seen feeding in the drifts of fine dust and leaves about the foundations of the cottages and at the bases of the mesquites. A few moments later it was captured by either a Sharp-shinned or a Cooper hawk.

Lincoln Sparrow. *Melospiza lincolnii,* subsp. Was first identified February 25, 1934. From March 6 to April 26, 18 were banded, many repeating consistently. They were caught in a sparrow trap, placed on a tongue of dry ground beside a sedge-filled pool. There is one later record, a single individual trapped and banded May 6.

It may be of interest to add a list of birds seen at Barker's Dam, in the Little San Bernardino Mountains (fig. 60). This region is now included in the Joshua Tree National Monument. It is about 25 miles from Twentynine Palms and has an elevation of nearly 4000 feet. The dam, built by cattle men across the outlet of a natural basin, impounds a lake of considerable size after seasons of heavy rainfall. Granite boulders and high cliffs practically surround the lake. The characteristic plant associations are the pinyon or single-leafed pine, scrub oak, manzanita, catalpa or "desert willow," and *Yucca mohavensis. Nolina parryi,* a rare plant of the lily family resembling the yuccas, is found here in abundance. The principal cactus is the "beaver tail" or "deer's tongue", *Opuntia basilaris.*

At this place on May 21, 1935, at least nine species of birds were observed within a few hours, at mid-day. Mourning Doves were very numerous. One female hummingbird was unidentified. Several species of swallows, including the Tree Swallow and the Cliff Swallow, were in continual flight high in the air or skimming the surface of the lake. Songs of the Say Phoebe, Western Mockingbird and an oriole, probably the Arizona Hooded, were heard. Linnets abounded, and one goldfinch of undetermined species was glimpsed. Unforgettable in that magnificent setting was the song of the Canyon Wren. Further observation there should yield some interesting records.

Berkeley, California, May 16, 1937.

SKELETAL STUDIES OF THE TROPICAL HAWK *HARPAGUS*

By LOYE MILLER

While collecting in the densely forested lands along the Caribbean shores of Panama, I was so fortunate as to secure a specimen of the peculiar little tropical hawk, *Harpagus bidentatus fasciatus.* (The following week Mr. Frank Richardson obtained a second specimen in the same area.) The general appearance of the bird when I picked it up was that of an *Accipiter* with an abbreviated tail, but I was completely mystified on close scrutiny to find two corneous denticles on each side of the bill. These "teeth" are even better developed than the single tooth of typical falcons. I had never before met such a bird, and the only books available in the field contained no record of it. He had to appear in my field record under the pseudonym of "Double-toothed Hawk."

On my return to California the generic and specific identity of the hawk was determined from Carriker's paper on the Birds of Costa Rica (Ann. Carnegie Mus., vol. 6, no. 7, 1910, pp. 314–915) and the Catalogue of Birds of the British Museum (R. Bowdler Sharpe, vol. 1, 1874). Both these publications place the genus *Harpagus* in close proximity to the falcons and to the kites. Sushkin (Nouv. Mem. Soc. Imp. Sci. Nat., Moscou, vol. 16, pt. 4, 1905) states that such an allocation of the genus is based upon the denticulation of the bill which he considers not fundamental. His opinion is that *Harpagus* is not to be assigned to the Falconidae. Peters, in his Birds of the World (Harvard Univ. Press, vol. 1, 1931), places the genus in the family Accipitridae and in the subfamily Milvinae immediately adjacent to the Accipitrinae.

My own immediate reaction, having only the fresh bird in hand, was that the kinship was with the accipitrids and not the falconids in spite of the denticulate bill. It was with much interest, then, that I looked forward to a study of the bird's skeleton.

Tarsus, tibia, coracoid and humerus were compared in detail, with the result that my first impression was greatly strengthened and I came to agree pretty closely with Peters' arrangement. He recognizes nine subfamilies of the Accipitridae which he lists seriatim with Accipitrinae as no. 4. The genus *Harpagus* is assigned to subfamily no. 3, the Milvinae, including the old world type, *Milvus milvus milvus*. The genus *Falco* is placed at the extreme end of the series of four subfamilies in the Falconidae. Assuming that Peters' arrangement is based upon his impression of the degree of kinship, *Harpagus* would appear almost as remote from *Falco* as it could well be. Even the aberrant *Pandion* lies between them! Peters' arrangement, exclusive of the cathartids and *Sagittarius* is as follows:

Superfamily	Falconidae		7. Circinae
Family	Accipitridae		8. Circaetinae
Subfamilies	1. Elaninae		9. Pandioninae
	2. Perninae	Family	Falconidae
	3. Milvinae	Subfamilies	1. Herpetotherinae
	4. Accipitrinae		2. Polyborinae
	5. Buteoninae		3. Polihieracinae
	6. Aegypiinae		4. Falconinae

This arrangement seems a smoothly flowing progression except that one might say it is necessary to "shift gears" to include Pandioninae in the itinerary.

A more detailed comparison of the several skeletal elements is as follows. *Harpagus bidentatus, Elanus leucurus, Accipiter cooperii,* and *Falco columbarius* are taken as typical forms.

Tarsometatarsus.—The proximal end of the tarsus, viewed from the anterior face, shows *Harpagus* to be close to *Accipiter,* less like *Elanus,* and far from *Falco.* The posterior and the articular views of the bone show exactly the same relationship. When the distal end is studied, there appears a more exaggerated inner trochlea than any of the other species. This throws the center of the foot farther toward the inner side than any of the others, though the degree is approached by *Elanus.* The outer trochlea is weak with little backward projection. This gives much less "transverse arching" to the foot. *Accipiter* approaches this character. The outer toe is less raised than in *Falco* or *Elanus,* but is much like that in *Accipiter.*

Tibiotarsus.—The tibia is strikingly like that of *Accipiter* in all respects except that the outer condyle is deeply cut away on the proximo-anterior sector of its arc. The outer condyle is thus reduced to a much smaller mass than the inner. None of the other genera has so marked a discrepancy between the condyles, though it is indicated in *Falco.*

The tendinal groove in *Falco* and *Elanus* is broad and deep; and, of course, in *Falco*, it is bifurcate. In *Accipiter* and *Harpagus* this groove is much constricted.

The width of the tibial shaft just proximal to the condyles is again suggestive of *Accipiter* in that the shaft is but little narrower than the condyles. In *Falco* and *Elanus* a marked widening through the condyles gives the impression of greater strength in the ankle joint. The posterior aspect of the condylar region is quite unlike *Falco* in its lack of a definite groove for the tendon of Achilles. It resembles *Accipiter* more than it does *Elanus* in that the internal condyle is not marked off by an obliquely transverse ridge.

Coracoid.—The coracoid of *Falco* differs very widely from that of *Elanus* or of *Accipiter*. *Harpagus* falls between these two latter genera in the characters of this bone. *Falco* has a long, slender procoracoid which is strongly flexed over the triosseal canal. This process is but moderately developed in the other three genera here compared. A coracoidal fenestra is complete in *Elanus*, is strongly notched in *Falco*, is faintly indicated in *Harpagus*, and entirely wanting in *Accipiter*.

The sterno-coracoidal imprint reaches far up the coracoidal shaft in *Falco*, is less extensive in *Elanus*, still less in *Harpagus*, and least in *Accipiter*. The sterno-coracoidal process follows the same sequence in respect to its breadth. The glenoid facet is broadest in *Accipiter* and *Harpagus*, is narrower in *Falco*, and narrowest in *Elanus*.

Humerus.—The affinities as displayed by the humerus all lie with *Accipiter*. *Elanus* has a long and almost straight humerus with subdued topography such as one finds in the sailing fliers. *Falco* stands at the opposite extreme with a short, sigmoidal humerus, widely expanded at the ends and very rugged in its contours. Such characters are found in birds of great speed and endurance on the wing. *Accipiter* and *Harpagus*, very much alike, occupy the intermediate ground that is correlated with the habit of a still-hunter who catches his prey by a quick dash from some place of concealment. Our much too brief observations in the field strengthen this latter deduction. Both specimens were taken in dense jungle from the jacaranda trees. Any bird, to be visible from the ground, must have come well down into the crown of the trees below the denser leaf zone, a typical accipitrine behavior. Insects constituted the only food identified in the stomach.

University of California at Los Angeles, April 17, 1937.

FROM FIELD AND STUDY

Occurrence of the White-tailed Kite in Northern California.—In view of the fact that records of the White-tailed Kite (*Elanus leucurus majusculus*) in northern California seem to be uncommon, I thought it best to publish my own observations on this species. Townsend (Proc. U. S. Nat. Mus., vol. 10, 1887, p. 201) states that two kites were seen by him near Red Bluff early in May, 1884. So far as I can ascertain, this is the only published record of kites in northern California unless certain records from Napa Valley are to be included and more recently those from Yolo County.

During October, 1933, I saw a White-tailed Kite flying over the Sacramento River bottom-land near Orland. The bird flew low over a field and except for hovering a couple of times, its flight resembled that of a Marsh Hawk. The next kite I saw was over chaparral near Cherokee. This time the bird was flying rapidly and soon disappeared from sight. Both this and the first observation were made in Butte County.

On April 29, 1937, I saw two White-tailed Kites chasing each other over a forest near Burney Falls in eastern Shasta County. This pair was observed with glasses for several minutes before they disappeared. They would fly at each other and after making a few aerial maneuvers would sail about with their legs hanging down. No cries or calls were heard.—Lloyd G. Ingles, *Chico State College, Chico, California, May 18, 1937.*

Virginia Rail Nesting at Benicia, California.—A set of eight fresh eggs of the Pacific Virginia Rail (*Rallus limicola zetarius*) was found on the Southampton Bay marsh, one mile west of Benicia, Solano County, California, on May 3, 1936. Though this species is reported as a fairly common resident in the San Francisco Bay marshes, records of eggs taken in this same region are few.

The nest reported above was located by a Benicia High School student, Manuel Costa, who led his science teacher, J. D. Graham, and myself to the patch of sedge, near the middle of which the nest of dry marsh-grass, was found. The sedge patch in which this nest was placed was about twelve feet in circumference, surrounded by a large stretch of salicornia, and about a hundred feet from a cattail bordered slough. As seems to be customary when nests of rails are approached, no bird was seen at or near the nest. Verification of my identification of the eggs as those of the Virginia Rail was made by Professor J. Grinnell at the Museum of Vertebrate Zoology in Berkeley.

On October 3, 1936, while looking over this marsh and hoping to observe a rail, I found another nest of this species, the egg shells in and about which indicated that the eggs had hatched in the previous nesting season. This nest, too, was in a small patch of sedge surrounded by a rather extensive growth of salicornia.—Emerson A. Stoner, *Benicia, California, October 3, 1936.*

A Vaux Swift and its Young.—On July 30, 1930, Messrs. J. M. Edson, E. J. Booth, and I visited the nest site of a Vaux Swift (*Chaetura vauxi*) at a packing plant in Bellingham, Washington. Edson (Murrelet, 1931, vol. 12, p. 25) reported upon certain observations on this bird, the young, and nest. The nest, constructed largely of sticks and cemented to the inside corner of a brick chimney about 12 inches below the roof of the building (fig. 61), contained four nearly full-fledged young. When I revisited the site on August 2, the young still were in the nest and the parent bird (presumed to be the female) was present, making frequent trips afield.

During the time I was at the nest, 9:37 a.m. to 11:15 a.m., the old bird made 8 trips as tabulated below.

Trip	Out	In	Minutes away from nest	Minutes at nest
1.	9:37	9:43	6	2
2.	9:45	9:46	1	2
3.	9:48	10:03	15	1
4.	10:04	10:07	3	2
5.	10:09	10:30	21	2
6.	10:32	10:37	5	12
7.	10:49	11:10	21	5
8.	11:15			

Although the variability of the time away from the nest (1 to 21 minutes) might indicate that two birds were engaged in feeding the young, I never saw more than a single adult bird at any one time. Because of this, I infer that only one parent was occupied in feeding them.

On this particular day, a strong wind was blowing from the east and the manner in which the parent bird entered the chimney was governed by the direction of its approach. When it returned flying into the wind, it glided, not more than 10 feet above the flat roof, to the chimney and "floated" into the aperture. When the approach was with the wind, however, the speed of the bird was greater, and usually it circled once about 30 feet above the roof and then dived into the opening. In leaving, it invariably flew over that part of the chimney farthest from the nest, thus taking advantage of a greater angle in its exit (see fig. 61).

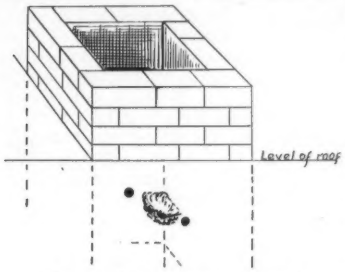

Fig. 61. Drawing indicating position of nest of Vaux Swift in chimney. Spots indicate places where parent perched when feeding young.

When I first looked into the chimney, I was greeted by the clamor of the young. Their calls consisted of series of rasping notes uttered in rapid succession. The young were perched on the edge of the nest, each with its posterior end projecting over the edge and with its head directed toward the corner of the chimney. Below the nest the chimney was streaked with excrement, a circumstance which indicated the young were not defecating in the nest. This probably explains the clean condition in which Edson (*ibid.*) found the empty nest when it was collected two days later. No evidence was obtained that the parent bird removed the fecal sacs of the young, although one can infer that it probably did when the young were smaller and unable to perch on the edge of the nest. Each time the parent returned from a trip afield, the young became vociferous, their calls lasting until the old bird left. By listening for the calls of the young, one could mark the coming and going of the adult.

After the parent had returned from its sixth trip, I moved close to the chimney and witnessed the feeding of the young. When first observed, the old bird was clinging to the chimney beside the nest, supported partly by the stiff tail feathers. The young were facing her (?), each with its mouth wide open clamoring for food and vying with its nest mates. I was led to wonder what relation existed between lustiness of voice and the chance of being fed at that particular visit. Later, after additional observations, I learned that proximity to the parent determined to a large extent which of the young was fed. At succeeding visits, the old bird alighted first at one side of the nest and then at the other, feeding the one, or ones, closest. The food, consisting of insects, largely leaf hoppers (as determined by gullet examination of the young), was placed far back in the open mouth of each young one.

To return to the first observation: After the parent bird had fed one of the young, it caught sight of me and dropped to a lower level in the chimney where it alighted out of sight. I moved closer and placed my head directly over the opening to get a better view. As I did so, I heard the rapid beating of wings and, thinking the bird was coming out, I instinctively jerked my head to one side to avoid being hit. It did not appear, so I looked in a second time and again I heard wing beats. This time I kept my position, and after my eyes had become adjusted to the darkness, I observed its stunt several times. The bird would let go its hold on the wall, and, by rapidly beating its wings, suspend itself in the middle of the chimney and at the same time produce the br-r-r-r-ing sound. Apparently the sound was produced by the beating of the wings themselves, for I could not observe them touching the sides of the chimney. During these performances the young were quiet. I interpreted this behavior as a means employed to intimidate the intruder, much as does the hissing of the chickadee or the swooping dive of the Red-tailed Hawk.—WILLIAM B. DAVIS, *Museum of Vertebrate Zoology, Berkeley, California, June 22, 1937.*

Hybridism between Myrtle and Audubon Warblers.—Looking around for something of interest to do, the fact came to mind that in the ornithological collection of the California Academy of Sciences there is a specimen of *Dendroica*, taken by W. Otto Emerson at Hayward, California, on April 4, 1901, that is labelled Audubon Warbler but has the word "hybrid" written slantingly across the label.

It happens that in the Auk (vol. 51, 1934, p. 243) is a description by Brodkorb of a hybrid between *Dendroica striata* and *Dendroica castanea*, which are closely related species, and accompanying the description is the remark that hybrids in this genus seemed to be of rare occurrence. As the Emerson specimen is undoubtedly a hybrid, this matter seemed to be worth looking into. As a beginning the indexes of the Auk, the Condor, and Bibliography of California Ornithology were

closely scanned for anything pertaining to such cross-breeding, but with little success. The only reference found was to an article by Taylor (Univ. Calif. Publ. Zool., vol. 7, 1911, pp. 173–175) which concerns the taking in northern Humboldt County, Nevada, of a number of specimens of *Dendroica*, most of which were the Audubon Warbler. There was one among them, however, that "presents an almost perfect blending of the characters of the two species, *auduboni* and *coronata*, taken on May 20, 1909 . . . . This furnishes the first instance known to the writer of hybridization within the genus *Dendroica*." The logical conclusion reached is that there does not seem to be any good reason why two such closely related species should not hybridize if their breeding grounds overlap or if populations of the two species intermingle, especially as hybrids between other members of this family are known.

The next step was to examine with care the specimens in the Academy, of the Audubon and Myrtle warblers, the latter including particularly the Hoover Warbler (*D. c. hooveri*), the Academy collection containing over 200 specimens of the Audubon and some 400 of the Myrtle group. All of these specimens were listed and carefully examined for deviations from normal. As the Audubon Warbler occurs only, except accidentally, west of the Rockies but slight deviations from normal were likely to be found among the Myrtle Warblers of the eastern states, which proved to be the case, those found being principally a white edging, usually quite narrow, along the inner vanes of the rectrices.

Of the few instances of departure from normal among the eastern specimens in the Academy there is a fully adult April male, no. 14760, California Academy of Sciences collection, from Delavan, southeastern Wisconsin, that is typical *coronata* except for a rather faint but easily perceptible whitish patch upon the fourth rectrix on the right side and a similar but less perceptible patch on the corresponding rectrix of the left side. This seems to suggest that this individual might have a trace of *auduboni* blood in its lineage, possibly two or three generations old. Another case, no. 41089, adult male in the Swarth collection, taken May 2, 1887, near Grand Crossing, Cook County, Illinois, has a distinct white patch on each of the fourth outer pair of rectrices. This specimen was taken by a man named J. L. Hancock, as shown by the original Morcom label, and it also carries a Swarth label on which is written "Rec'd from G. F. Morcom". No comment concerning the white patches on the rectrices appears on the label or in the card index where the specimen is entered as number 409 of the Swarth collection.

Another slight departure from normal among the eastern birds is no. Ex. 6824, Mailliard collection, from the central part of New York State, taken April 4, 1896, that has the normal white spots on three outer rectrices, but, in addition, has a distinct white spot, 3.6 x 4.6 millimeters in size, upon the fourth rectrix on the left side. The corresponding rectrix on the right side is unfortunately missing. The head has the postocular and supraloral streaks slight and poorly defined; the wing and tail measurements are close to the maxima given for the species in Ridgway's Birds of North and Middle America.

Examination of our specimens from the Pacific Coast shows a very different state of affairs, as there are several unquestionable examples of hybridism between *Dendroica auduboni* and *D. coronata*. At the time of the last annual meeting of the Cooper Ornithological Club this fact was mentioned to Dr. Louis B. Bishop, who told me that there were several similar hybrids in his collection. This rather dampened my ardor as regards writing up the subject, yet it seems that it should be of interest to a good many readers of the Condor to give them descriptions of at least a few of our cross-breeds. For example no. Ex. 6840, Mailliard collection, the male adult mentioned in the first paragraph of this paper, is near *D. coronata hooveri* but has some lemon-yellow feathers among the white feathers of the chin and middle throat; the head has the supraloral and postocular streaks well developed and the three outer pairs of rectrices have the normal white spots of *coronata*, but the fourth pair show heavy white edgings on their inner vanes. The white tipping on the wing coverts is more of the *auduboni* type. Number 14738, C. A. S. collection, an adult male with no date given, labeled *D. coronata hooveri*, was taken by Beck at Berryessa, California, and evidently was sent to Ridgway for identification, by whom it was returned with the words "Yes! Typical, R.R." written on the label; yet the specimen has white on the fourth pair of rectrices besides having it on the regulation three for *coronata*. It also has only an indication of supraloral and postocular streaks on the right side of the head and none on the left side.

Number 14867, C. A. S. collection, male immature, taken at Palo Alto, California, January 21, 1899, by Theodore J. Hoover, is close to *D. c. hooveri* but has the chin and upper part of throat lemon yellow. Number Ex. 3694, Mailliard collection, is an adult female taken April 6, 1905, in Santa Clara County, California, by H. O. Jenkins, that is nearest to *D. c. hooveri* but has a narrow, elongated patch, distinctly white, on the fourth rectrix of the left side and a small patch of grayish white at the extremity of the corresponding rectrix of the right side. Number 16661, C. A. S. collection,

male immature, taken in Sonoma County, California, December 5, 1886, is close to *D. c. auduboni* but has white upon only three of the outer rectrices, has too much white on the eyelids for this species and has a slight indication of postocular streaking, this latter being more distinct on one side of the head than on the other.

Number 42136, C. A. S. collection, male adult, was taken by Swarth, at Atlin, B. C., a breeding ground of *coronata*, April 22, 1934, and is close to typical *coronata*, but on one side the fourth rectrix has an intrusion of white of about the average size found in *auduboni*, whereas the fourth and fifth rectrices of the other side have heavy white edgings. Also, the supraloral streaks are absent and the postocular streaks are much restricted. Strange to say, Swarth did not mention this specimen to me on his return from the Atlin trip, and no comment appears upon the label.

The examples of hybridism above described are the most prominent ones in the Academy collections. There are also other specimens from the Pacific Coast which show more or less indications of mixed blood, but those described herein are sufficient evidences of hybridism to show, beyond question, that there surely must be a locality, as yet not discovered, where there is at least some contact in the nesting season between the two species.—JOSEPH MAILLIARD, *California Academy of Sciences, San Francisco, California, July 8, 1937.*

A Brown Pelican Record from Utah.—While visiting with a group of ornithology students, April 28, 1934, at the Rudy Duck Club near the mouth of the Jordan River on the southeast shore of Great Salt Lake, we observed a flock of about 20 to 30 White Pelicans (*Pelecanus erythrorhynchos*) among which was a pelican of brown plumage distinctly contrasting with the other birds, which we concluded must be a Brown Pelican (*Pelecanus occidentalis*). We observed the bird in the flock several times during the day, but could not be sure of the subspecies. However, because of its size, closely approaching that of the White Pelican, and because it was with other birds that had probably come up from the southwest coast, we leaned to the belief that it was a California Brown Pelican (*P. o. californicus*).—A. M. WOODBURY, *University of Utah, Salt Lake City, June 15, 1937.*

The Duck Hawk Breeding in Nevada.—Jean M. Linsdale in his "The Birds of Nevada" (Pac. Coast Avif. no. 23, 1936) lists the only records of the occurrence of the Duck Hawk (*Falco peregrinus anatum*) in Nevada, as one specimen taken by Ridgway in 1868, and sight records in 1868 and 1931. It would therefore appear to be of interest to place on record that there is a set of four Duck Hawk eggs in the Barnes Oological Collection, Field Museum, Chicago, which are recorded as having been taken by F. H. Lord, April 3, 1910, at Walker Lake, Nevada.

I examined this set some time ago and the eggs are unquestionably those of this species; but I have been unable to secure any information as to where they were obtained by Mr. Barnes or any trace of the collector.—CAPTAIN L. R. WOLFE, U. S. ARMY, *May 2, 1937.*

The House Finch at Victoria, British Columbia.—A recent note of interest is that of the occurrence of the House Finch (*Carpodacus mexicanus*) as a breeding resident at Victoria, British Columbia. The birds were first noticed on May 28, when the song of the male attracted my attention. From that date I saw one or both birds daily and soon discovered that they were feeding young. The nest was situated 9 feet from the ground in a Virginia creeper on the south-facing wall of a brick building. On June 10 the writer, accompanied by Mr. Kenneth Racey of Vancouver, B. C., found that the young had left the nest, and two specimens were secured.

Five days later the male was again in full song, and the female was seen carrying nesting material to a new site on the same building. The male of the pair is evidently a young bird, as there is but a slight trace of yellowish pink on the face and throat. The area surrounding the base of the bill appears strongly darker than the rest of the head. The bird is almost identical with a specimen taken in Berkeley on May 16, 1935.

Inasmuch as this finch for the past 3 or 4 years has been reported by Mr. S. J. Darcus, on the basis of sight records, as a regular breeding resident at Penticton, B. C., it will be interesting to see if the House Finch is permanently extending its range to include the humid Transition Zone of coastal British Columbia and the arid Transition Zone of the interior of the province.—IAN MCTAGGART COWAN, *Provincial Museum, Victoria, B. C., June 19, 1937.*

A New Race of Titmouse, from the Kern Basin of California.—The description of the race *Baeolophus inornatus zaleptus* (Oberholser, Sci. Publ. Cleveland Mus. Nat. Hist., vol. 4, 1932, p. 7) from southeastern Oregon, together with Linsdale's (Pac. Coast Avif. no. 23, 1936, pp. 87–88) recognition of this subspecies from Nevada, has led us to a reconsideration of the status of the titmouses in the Museum of Vertebrate Zoology from the eastern parts of California. In doing this,

particular attention came to be paid to a series from Walker Basin, Kern County, collected in the fall of 1933, which has remained unsatisfactorily identified. In conclusion, we now think it advisable to name this Kern County population, as follows:

Baeolophus inornatus kernensis, new subspecies. Kern Basin Plain Titmouse.

Type.—Adult male, no. 63801, Mus. Vert. Zool.; Rankin Ranch, 3300 feet, Walker Basin, Kern County, California; November 19, 1933; collected by R. M. Gilmore, orig. no. 3235.

Diagnosis.—Compared as to coloration with *B. i. inornatus*, dorsum grayer, less brownish, and flanks and underparts generally slightly less buffy, clearer whitish; compared with *B. i. transpositus*, less olivaceous dorsally, and paler gray below; less clearly gray dorsally, but paler below, than in *zaleptus*. In size characters, closest to *inornatus;* bill decidedly shorter, less massive, than in *zaleptus*, and less massive even than in *transpositus*.

Measurements.—Of type: Wing, 68.6 mm.; tail, 58.4; tarsus, 20.3; hind toe with claw, 13.4; culmen, 9.8; bill from nostril, 8.0; depth of bill at base, 4.9.

Geographic Range.—Drainage basin of Kern River, within southeastern rim of San Joaquin Valley, in Kern County and extreme southern Tulare County, California. Thirty-seven specimens examined, from the following localities. In Kern County: Rankin Ranch, 3300–3700 feet, Walker Basin; Thompson Canyon, 3900 feet, Walker Basin; east end Walker Basin, 3500 feet; French Gulch, 6700 feet, Piute Mountains; Kern River at Bodfish, 2400 feet; Greenhorn Mountains, 5500 feet, 8 mi. W. Isabella; Isabella, 2500 feet; Fay Creek, 4100 feet; Weldon, 2650 feet; Onyx, 2750 feet; west slope Walker Pass, 4600 feet. In Tulare County: Trout Creek at 6000 feet.

Remarks.—As in the case of the brown towhee (*Pipilo fuscus kernensis*), we find in the Kern drainage basin of the southern Sierra Nevada a center of differentiation for titmouses. The population from this region presents in color tone a more grayish appearance than populations from southwestern and central California; yet there is not the extreme grayness as seen in titmouses from the Great Basin. Although intermediate in color between Pacific-slope forms and those of the Great Basin, it is doubtful whether direct intergradation with any of the latter races actually exists because of the great disparity in bill size, unbridged by any specimen seen. It is doubtful now that true *griseus* occurs at all in California, even at the extreme south; specimens heretofore referred to that race we now think all belong to *zaleptus*. According to this belief, the latter race occurs south along the eastern border of California at least as far as Waucoba Pass, Inyo County. Specimens from there in the Museum of Vertebrate Zoology, obtained in June, 1937, are like topotypes of *zaleptus*.

Examples in fresh fall plumage from the vicinity of Miramonte, Fresno County, in the oak belt on the east side of the San Joaquin Valley, are somewhat paler than examples from farther north and from the San Francisco Bay region, being thus interpretable as intermediates approaching *kernensis*. This influence even seems to extend as far north as the Yosemite area. We may infer that the race *kernensis* has its closest affinities with *inornatus*, with which it thus does definitely intergrade northward along the west-Sierran foothills. We have here, then, another of the long trends so common in geographically variable birds over that general part of the state.

Titmouses at hand in unworn plumage from Waltham Creek, 4½ miles southeast of Priest Valley, Fresno County, a locality on the opposite, western side of the Great Valley, also are paler than typical *inornatus* and thus show an approach toward *kernensis*. In this respect as well as in the southward tendency toward paler tones along the Sierra Nevada, the titmouses show a remarkable parallel to conditions in the brown towhees as previously noted (Grinnell and Behle, Condor, vol. 39, 1937, p. 177).—Joseph Grinnell and William H. Behle, *Museum of Vertebrate Zoology, Berkeley, California, June 29, 1937.*

Off-shore Bird Notes.—Recently, through the kindness of J. R. Pemberton, I was privileged to make a trip to the Cortez and Tanner bank region, off extreme southern California. On the morning of June 26, 1937, we left San Pedro on Mr. Pemberton's yacht "Kinkajou", and, laying a course between Catalina and San Clemente islands to the vicinity of Cortez Bank, we hove to near Bishop Rock shortly after dark. During the day's trip, deep water birds were not very common, but we saw several shearwaters (*Puffinus griseus* and *P. creatopus*), one or two Black Petrels (*Oceanodroma melania*), and a few Black-footed Albatrosses (*Diomedea nigripes*).

On the following morning, June 27, three specimens of Black-footed Albatross were secured near Cortez Bank; then we started north in the direction of Santa Barbara Island. At latitude 32° 50′ N, longitude 119° W, about thirty miles west of San Clemente Island, a Red-billed Tropic Bird (*Phaëthon aethereus*) flew by the ship. By waving a handkerchief I succeeded in bringing the bird within range and shot it. It proved to be an immature male, and is now number 18778, collection of the Los Angeles Museum. While we were maneuvering to pick the bird up, a Black-footed Albatross came to investigate it and was collected.—G. Willett, *Los Angeles Museum, Los Angeles, California, July 6, 1937.*

Sleeping Posture of a Virginia Rail.—On November 29, 1936, Robert Stall, a Benicia High School student, brought me a live Pacific Virginia Rail (*Rallus limicola zetarius*) which he said his dog had caught on the edge of a pond while he was duck hunting four miles northeast of Benicia, California. I released the bird in the house, and, though somewhat bewildered, it was quite active, running about the floor though not attempting to fly. In the evening it perched on a log by the fireplace and, placing its head under the right wing, went to sleep.

In this posture, looking like a round ball of feathers, one would hardly recognize the bird as a member of the proverbially-slender rail family. It struck me as so odd that he should assume this round ball-like form when asleep that I placed two strong electric lamps in front of him and recorded the posture with my camera (fig. 62). Several times during the evening, when disturbed, he withdrew his head from under his right wing, looked about a bit, and replaced his head, each time under the right wing. He was left on the log by the fireplace when we retired for the night, and in the morning, after a little search, I found him bunched up under the chesterfield with his head under the same right wing.

Fig. 62. Virginia Rail in sleeping position.

I had intended to experiment on feeding it at noon, but upon my arrival home, Mrs. Stoner reported to me that she had found it dead in the dining room late in the morning. Upon preserving it as a skin, I found it to be a female. No evidence of injury was found. In the stomach was a size six, lead shot which it had eaten along with fifteen hard-cased seeds of about the same size as the shot.—EMERSON A. STONER, *Benicia, California, December 23, 1936.*

The Cowbirds of the Sacramento Valley, California.—Much has been written of late concerning the cowbirds in central California. In addition to disclosing new localities of occurrence, doubts have been expressed as to the validity of the race *Molothrus ater californicus* with range in the southern end of the San Joaquin Valley. To date, however, little has been said about the cowbirds of the Sacramento Valley, doubtless, because of lack of representative material from that region.

Important in filling this gap in our knowledge is a series of 24 cowbirds recently acquired by the Museum of Vertebrate Zoology from Oroville, Butte County, California. These specimens were brought to the Museum in the flesh by Mr. William B. Davis who secured them from Mr. A. E. Darby of Oroville, on May 9, 1937. They were captured by Mr. Darby in his pheasant pens, where they had gone through an inch wire-mesh to get to grain inside the pens. Once inside, they were unable to get out. Mr. Davis learned that some 75 other individuals had been caught and killed in this same way just prior to the lot which he obtained, which gives an indication of the abundance of cowbirds in that vicinity.

The testes of the males in this series were in general about 5 or 6 mm. in length while the largest ova of the females were about 1½ or 2 mm. in diameter. Thus the birds seemed to be in an early breeding stage. Individuals varied in the amount of fat present, although most of them were comparatively fat-free. The 15 males had an average weight of 41.2 grams, the 9 females 30.4 grams.

Average and extreme measurements of the Oroville examples are as follows. Males (15 specimens): wing, 101.2 (98.3–104.3); tail, 69.2 (65.3–72.0); culmen 16.3 (15.0–17.8); bill depth at base 10.0 (9.3–10.9); tarsus, 24.5 (23.1–25.6). Females (9 specimens): wing, 91.2 (90.1–93.9); tail 62.9 (60.9–85.2); culmen 14.5 (13.8–15.5); bill depth at base, 9.0 (8.4–9.6); tarsus 23.0 (22.2–24.9). To assure my measurements being comparable with those of other authors, I have checked results on specimens measured and recorded by various others.

The measurements that Dickey and van Rossem (Condor, vol. 24, 1922, pp. 206–210) gave for their race *californicus* indicated a considerable increase in size for the southern San Joaquin Valley population over the average for *obscurus*. However, my measurements for the Oroville series conform closely to those for *obscurus*, rather than to those for *californicus*. Consequently the Sacramento Valley examples are several millimeters smaller in wing and tail lengths than those of the southern San Joaquin Valley. Only for the tarsus measurement is there evidence at all of slightly larger size for the Sacramento Valley birds.

The Oroville females are darker than obviously faded and worn series of breeding females from the lower Colorado River region, but they are no darker than five females of the race *obscurus* taken in early May in Clark County, Nevada, opposite Fort Mohave. Also I fail to see any mass differences in streaking on the under parts of the Oroville females as compared with specimens from elsewhere in California. My conclusion is that the Sacramento Valley birds must be placed under the name *Molothrus ater obscurus*.

The facts that the Sacramento Valley cowbirds at hand fail to show the supposed characters of *californicus* but rather conform in their characters to those of *obscurus*, and that there is apparent lack of physical barriers in the Great Valley, serve as additional evidence that the race *californicus* is not "usefully recognizable." There is the remote possibility that the Buena Vista Lake sample of Dickey and van Rossem happened to be an aggregate of unusually large individuals. More likely the population is actually larger in certain measurable characters. Even if such is the case, it would not be an unusual practice to recognize the local situation but not designate so restricted and weakly differentiated a population by name.

Miller (Condor, vol. 37, 1935, pp. 217–218) made the point that if we do not recognize the race *californicus*, we should not allow this to obscure the fact as pointed out by Dickey and van Rossem that there is an increase in size northward in the state to the San Joaquin Valley. My findings with regard to the Oroville examples throw doubt upon the existence of such a trend; if such is present, certainly it continues no farther north than the San Joaquin Valley.

Willett (Pac. Coast Avif. No. 21, 1933, pp. 156) expressed his feelings in regard to the validity of *californicus* in a statement which was later quoted by Grinnell (Condor, vol. 36, 1934, p. 214) to the effect that *californicus* is apparently an intergrade between *obscurus* and *artemisiae*, somewhere nearer the former. The Oroville series at hand proves with certainty that the cowbirds from the Sacramento Valley do not show even an approach to *artemisiae* which seems restricted in the breeding season to the east of the Sierra-Cascade chain of mountains. It seems likely, then, that the increase in size of the southern San Joaquin Valley population may be accounted for by a relatively late infusion of *artemisiae* stock coming, not by the way of the Sacramento Valley, but around the southern end of the Sierra Nevada through the Kern River gap. If this inference is tenable, another likelihood is that a further northward extension of this inpushing stock would account for the apparent arrival within recent years of large-sized cowbirds in the San Francisco Bay region, as Miller (*op. cit.*, p. 218) has suggested.—WILLIAM H. BEHLE, *Museum of Vertebrate Zoology, Berkeley, California, June 30, 1937.*

Some Additional Records of Birds for Northeastern California.—Extensive travel is always productive of ornithological things of interest. The following notes are results of such, in addition to those recorded in the January, 1936, issue of the *Condor*.

On November 8, 1935, while driving from Grasshopper Valley to Termo in Lassen County, in company with Mr. A. L. Brown of the Division of Fish and Game, we saw a large white bird some distance ahead of the car. It was standing on the edge of a small pool of water on the edge of a little meadow formed by Bailey Creek. We drove the car up to within thirty feet of the bird as it stood on the opposite side of the fence from the road. It was an adult swan, extremely large, with no yellow spot on the bill in front of the eye. The bill and head were not shaped like those of a Whistling Swan.

I had seen Trumpeter Swans at close range in Yellowstone National Park, and Mr. Brown had seen them as a boy in Honey Lake Valley, Lassen County; so we both were convinced that the bird was one of this species (*Cygnus buccinator*). After several minutes the bird flew a short distance and gave a deep resonant call, not at all like that of the Whistling Swan. It stopped on the other side of the grassy field near another water hole. Much of our observation was made with an 8-power binocular which at close range brought out every marking distinctly.

On January 9, 1936, while driving up Chimney Canyon, back of Doyle, in southern Lassen County, I noted a large hawk flying along rather low in the cottonwoods. The bird kept about one hundred and fifty yards ahead of the car, flying from one tree to another. At first I thought it was just another red-tail, but on one occasion it turned around facing the car after perching on a limb overhanging the road. I then noticed the peculiarly marked breast and therefore collected it. It was a female Harlan Hawk (*Buteo borealis harlani*). On February 17, 1936, I collected another of these hawks, five miles southeast of Standish, in Honey Lake Valley, Lassen County. These specimens are quite differently marked from the ordinary melanistic Red-tailed Hawks which are quite common in the region. The first of these two specimens is in my own collection, and the other is in the Museum of Vertebrate Zoology at Berkeley.

I was looking at a flock of Gambel Sparrows about three miles southeast of Standish, in Honey Lake Valley, on March 18, 1935, when an immature male Harris Sparrow (*Zonotrichia querula*)

hopped up on a fence post a few feet from the car. This was collected and is now in my collection. On the same day, another was seen near Buntingville, about five miles west of where the first one was collected.

On February 20, 1936, on the J. J. Fleming Ranch, about three miles west of Wendel, Honey Lake Valley, I collected an adult male Harris Sparrow from another large flock of Gambel Sparrows. This bird was seen first on the 19th. In this flock were several Western Tree Sparrows (*Spizella arborea ochracea*).

On February 20, 1936, while passing the same brush patch where I secured the first Harris Sparrow, about three miles southeast of Standish, I collected a female White-throated Sparrow (*Zonotrichia albicollis*).

Near the Dill Ranch, six miles southeast of Standish, on January 8, 1936, I secured an adult female Western Tree Sparrow. This bird was alone in open sagebrush and grassland. On February 19, 1936, three miles west of Wendel, I was fortunate in collecting another Western Tree Sparrow, which was an adult male. This was in the same flock of Gambel Sparrows from which the adult male Harris Sparrow was taken the following day.

During some fairly cold weather on January 2, 1937, as I was looking at some horned larks on Mud Flat, eight miles east of Litchfield, Lassen County, I heard and later saw and collected an adult male Alaska Longspur (*Calcarius lapponicus alascensis*). This bird was with a very large scattered flock of assorted horned larks. I was quite sure that after I collected the specimen I heard other longspurs chattering in the flock of several thousand horned larks as they milled about following the sound of the shot.—DONALD D. MCLEAN, *Division of Fish and Game, San Francisco, California, June 14, 1937.*

A Pliocene Record of Parapavo from Texas.—A most interesting Upper Pliocene vertebrate fauna has lately been assembled from Cita Canyon, in Randall County, Texas, by a party from the West Texas State Teachers College.

Among the specimens thus far removed there appear two tarsometatarsi of the California Turkey, *Parapavo californicus* (L. Miller). Both bones are from the right side and one of them is almost without blemish except for the loss of the spur core. The second bone is fragmental but has the spur core almost complete. Comparison was made with typical specimens from the Rancho La Brea asphalt with the result that no hesitation is felt in specific assignment of the Texas specimens—size, proportions, elevation of the spur core, relative positions of the trochleae, the small intertrochlear foramen on the inner side, the shape of the proximal cotylae and hypotarsus, the incipient hypotarsal third ridge—all are characters that check perfectly with the specimens from the type locality.

The fairly abundant mammal fauna is being studied by the junior author, but the presence of certain carnivores (*Borophagus*) is considered by R. A. Stirton of the California Museum of Paleontology as definitely indicating its Upper Pliocene age. The specimens were beautifully preserved in fine river sand laid down in a practically continuous series reaching up possibly into true Pleistocene. The interest to ornithology lies in the extension of range of *Parapavo* both in space and in time. The species probably originated in Pliocene and increased to maximum numbers in Pleistocene before its extinction fairly late in the latter epoch.

It is a pleasure to acknowledge the courtesy of Mr. Stirton for diagnosis of the age of the stratum.—LOYE MILLER, *University of California at Los Angeles,* and C. STUART JOHNSTONE, *West Texas State Teachers College, Canyon, Texas.*

Additional Birds Observed at Point Lobos Reserve.—The following two records are offered as additions to the list of birds observed on Point Lobos Reserve, Monterey County, California, as included in the report by Grinnell and Linsdale (Carnegie Inst. Wash., Publ. No. 481, 1936).

Glaucidium gnoma. Pigmy Owl. On August 22, 1936, at 4:55 p.m., a bird of this species was seen perched on the extremity of a limb near the top of a large cypress east of Whalers Knoll. The bird was facing toward the west with the sun full on it, the pupils of its eyes much contracted. When a Red-tailed Hawk lit in a pine near-by it drew itself up in a stiff, elongated posture. The right wing was partly unfolded.

Ammodramus savannarum. Grasshopper Sparrow. From the road just west of the warden's house on June 30, 1937, at 12:30 p.m., the song of a grasshopper sparrow was heard coming from the vicinity of the garbage dump. Soon the bird was located on a baccharis bush between the garbage dump and the road leading to the wharf. After a while the bird was observed to have left the bush. Later the song was again heard coming from a weed-top close to the route of the now-abandoned Bassett Avenue. Presently it flew down into the grasses where it was flushed and then lost.—LAIDLAW O. WILLIAMS, *Carmel, California, August 5, 1937.*

NOTES AND NEWS

The review section of the current volume of the *Auk* continues to give attention to mimeographed writings by listing merely the titles of journals appearing in this form. This discreet practice revives in our minds the question of the status of mimeographed contributions as formal publications. Mimeographing can not be commended from the standpoint of permanency, but no absolute criterion of this sort can be applied in view of the ephemeral nature of much that is printed in orthodox fashion. More significant is the matter of the meager editorial scrutiny which some mimeographed contributions receive; this deters their recognition as publications. Care in selection of material and in its preparation is in a measure proportional to the cost of publication. Somewhere the scientific bibliographer must draw lines, and one of these lines can be set automatically to exclude mimeographed writings, thus placing them in the category of manuscripts. Such arbitrary limitation should be less open to criticism than a debatable selection made on the basis of adjudged merit of the contribution involved. Storer, in *Science* (vol. 75, 1932, pp. 486–487), discussed this question and in the end accepted Stiles' view that any material intended for permanent record and made reasonably available should be considered published. This would include, therefore, certain mimeographed "publications." It would be unthinkable that any serious investigator would ignore mimeographed material if something really pertinent to the solution of his problem could be obtained from it. So likewise with material available to him in ordinary manuscripts. However, from the legalistic angle of nomenclature and in other circumstances of similarly formal nature we hold that mimeographing does not constitute publication. —A. H. M.

The postcard vote called for in our last issue (p. 180) on the question of completely closing the season on waterfowl (ducks and geese), versus continuance of an annual open season, met with sufficient response, we think, to be fairly significant. The vote was 23 to 1 for a closed season of at least two years' duration; some were for a much longer closed period. Only one vote was received from any person vocationally identified with a state or federal agency engaged in game administration, although several voters are, or have been, hunters. This was thus an expression of judgment by free-lance naturalists; and for the most part these are field observers in the West. Speaking, now, for the one person whose initials are appended, the declaration of a prolonged closed season seems the only practicable method in sight of saving the rarer *species* from extinction—from joining the limbo of the Labrador Duck. It is believed that the present factor of shooting is the dominant one against the ducks; but if reduced nesting ground be the most important adverse factor,then, say, a 3-year respite from gunning would prove the point: Marked increase then would justify throwing the season open again. We as naturalists are doubtless "sentimental" in this matter: we abhor the wiping out of *any species*—the lopping off of the results of age-long evolutionary process. To many hunters, no doubt, mallards and pintails are the "best" ducks anyway, and as long as these can be fostered through "management" of breeding grounds and can hold up under the annual shooting, all is rosy. But the naturalist equally desires the continued existence of the canvasback, redhead, spoonbill, ringneck, ruddy, and the rest. These other less tolerant ducks, we hold, could all suffer extermination and still there might be "ducks unlimited" from the sportsman's viewpoint. *We* want to insure continuing existence of *all* our species of waterfowl. Again this fall there will be slaughter of ducks and without discrimination of species on the part of many shooters; this was decided in places of authority long ago. But another year will come, and everyone nature-minded should study the problem and then publicly stand by the conclusions he reaches; we yearn for real waterfowl protection before any species is actually gone.—J. G.

The magazine "Aviculture", published by the Avicultural Society of America, is now edited by two Pacific Coast representatives of that organization, Dr. Leon Patrick and Mr. Eric C. Kinsey. Both men are members of the Cooper Ornithological Club. It is hoped that the profitable interchange of ideas between aviculturalists and Cooper Club members with other special interests will be continued and amplified through this fortunate circumstance. Mr. Kinsey as associate editor has announced to us the intention of making the magazine one of high scientific worth.—A. H. M.

We have read lately at least three government bulletins in which methods of stopping or lessening damage done by birds are recommended, other than by killing the birds. Contrivances to repel levies by birds upon crops or upon fishes in ponds, or to exclude them from access to these, have been devised through observation and experimentation, and they prove to be cheap to construct and thoroughly effective. We particularly commend to our readers, in illustration of this kind of economic treatise, Leaflet No. 120, U. S. D. A., "Excluding Birds from Reservoirs and Fishponds", written by W. L. McAtee and S. E. Piper. The trend thus away from the killing of birds, by poison or otherwise, for "economic"

reasons, is one that will be warmly commended by all naturalists who are concerned over the welfare of our native bird-life.—J. G.

Of decided historical as well as ornithological bearing is the contribution entitled "Birds of the Southwest | By | Charles Edward Howard Aiken" (Colorado College Publ. No. 212, Colorado Springs, March, 1937, 78 pp., map). This is a compilation painstakingly done by Edward R. Warren from the notes and collections left by Aiken and now owned by the Colorado College. The feature of greatest interest, perhaps, to readers outside of Colorado is Aiken's journal of his trip to New Mexico and Arizona in 1876. This includes many data concerning the birds met with, some of which must be new to published literature and have importance for a knowledge of the changing status of bird-life in a 60-year period. Mr. Warren not only edited this entire contribution, but also is responsible for the extended biography of Aiken which forms part of it.—J. G.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MAY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, May 27, at 8 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Kinsey in the chair and about fifty members and guests present. The president took occasion publicly to thank Mr. William H. Behle for the large part which he, as general chairman, played in the success of the annual meeting in April. Minutes of the Northern Division for March and of the Southern Division for March and April were read by title only. Applications for membership were read from A. E. Culbertson, Fresno State College, Fresno, California, proposed by William T. Shaw, and W. Lawton Hargreaves, Lakehurst Hotel, 1569 Jackson Street, Oakland, proposed by Hilda W. Grinnell.

Mr. Kinsey praised the work of the Junior Audubon Societies of Marin County in protecting nesting birds on the school grounds. Mr. Dyer said that young thrashers which he is hand feeding had begun to sing, although only a week out of the nest. Mr. Hargreaves described the nesting site of a pair of Western Bluebirds in the garden of an old house on Broadway at Webster Street in Oakland, a section having heavy traffic. Mr. Kinsey told of the almost complete extermination of formerly large colonies of Yellow-billed Magpies in Hall's Valley, near Mt. Hamilton, due probably to shooting and to poison set out for rodents, in spite of protection on the extensive privately owned ranch of J. B. Grant. There was discussion of the attraction of rock salt for many bird species in their natural state. English aviculturists have long considered table salt detrimental but are now experimenting with rock salt.

Mr. Gordon H. True, Jr., Economic Biologist of the State Division of Fish and Game, spoke on "Introduced Game Birds in California." He outlined the history of game introduction in this state, which began with individual attempts and is now carried on by the California Fish and Game Commission from a center at the Yountville Game Farm. Present methods he illustrated with three examples: the Chinese Pheasant, a distinct success, the Hungarian Partridge, not successful, and the Chukar Partridge, whose status remains an unknown quantity. He concluded that the importing of exotic species is justifiable where an unoccupied ecologic niche may be filled, but questioned the propriety of bringing in species which would compete with native species.

A reel of motion pictures of Utah shore birds, taken by Dr. John W. Sugden, was shown by Mr. Behle. These pictures were taken at the Bear River Refuge, the heronries of the Jordan and Bear rivers, and islands of Great Salt Lake and Utah Lake. A nesting colony of Franklin Gulls was of particular interest. Mr. Dyer very kindly loaned his motion picture projector for the occasion, and he himself presented a reel in colors showing Allen Hummingbirds in his garden in Piedmont and ducks on Stow Lake in Golden Gate Park, San Francisco.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

JUNE.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, June 24, 1937, at 8 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Kinsey in the chair and about thirty members and guests present. Minutes of the Northern Division for May were read and approved. Minutes of the Southern Division for May were read. Names proposed for membership were as follows: Mrs. Victor Bello, Ross Grammar School, Ross, California, by Mrs. Otis H. Smith; Mr. Arthur W. Jefcoat, care Pacific Gas and Electric Company, Paynes Creek, California, by J. M. Linsdale; Mr. Chandler P. North, 68 Tamalpais Road, Berkeley, by Frank Richardson.

Mr. Alden Miller read a letter from Mr. John H. Baker, together with a resolution adopted by the Board of Directors of the National Association of Audubon Societies condemning the practice of poisoning native wild mammals by Federal and State agencies. Mr. Baker requested the adoption by this club of the same or a similar resolution, and the sending of notice of action taken, with copy of the resolution, to the President of the United States, White House, Washington, D. C. The resolution was unanimously adopted and the action authorized.

Mr. Covell asked whether or not the Cooper

Club wished to post notices of its meetings, or notice of the existence of the Club, on the bulletin board at Lake Merritt, as had been suggested at a previous meeting. After some discussion, the question was laid aside.

The topic for the evening, "June in the Field," brought many valuable contributions from members. Mr. Grinnell gave two outstanding observations from his recent trip to the eastern side of the Sierra Nevada. In Walker Pass, a clump of tree yuccas has contained a nest of the Scott Oriole each year visited since 1911, when the nest of that year was brought to the Museum of Vertebrate Zoology. As an example of a bird species occurring in many kinds of places, he cited the Western Chipping Sparrow, from the waterless Waucoba Pass, in the Inyo Mountains, and from Ebbetts Pass, abundantly watered by melting snow, in the Sierra Nevada. Mr. Alden Miller reported on a month of field work in eastern Oregon, stressing the shore birds and waterfowl. Frank Richardson outlined woodpecker habitat relationships as observed on the same trip; and Joe Marshall discussed the *Empidonax* flycatchers met with. Mrs. Kelly described a visit to the Lake Malheur Refuge in Oregon, and noted a seeming scarcity of birds there.

Mr. Danforth told of a trip to Cleveland, Ohio, where he had found indications of local increase of many species, including the Orchard Oriole, Cardinal and Scarlet Tanager. Mrs. Bamford, who had made a trip down the west coast of Mexico in March, spoke of such interesting species as the Snowy Heron, Vermilion Flycatcher and Clarino, and, on the east coast, the Scissor-tailed Flycatcher. Miss Rinehart told of observing twenty-five bird species while studying native plants in the Blakesly Botanic Garden, Santa Barbara. Mr. Kinsey had gone to Eagle Lake for Townsend Solitaires and had searched for a number of species in the deserts of southern California. He expressed his deep appreciation of the delightful reception given in honor of him and of Mrs. Kinsey by the Marquess Hachisuka and other members of the Southern Division of the Cooper Club, jointly with certain other ornithological groups.

Adjourned.—Frances Carter, *Recording Secretary.*

SOUTHERN DIVISION

May.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, May 25, at 8 p.m. at the Los Angeles Museum, Exposition Park, Los Angeles, with President Little in the chair and fifty-five members and guests present. Minutes of the Southern Division for April were read and approved. Minutes of the Northern Division for March were read.

President Little spoke on the recent publication by the National Museum of Bulletin 167, The North American Birds of Prey, by A. C. Bent. Members who had not secured a copy were urged to do so before the supply was exhausted. Mr. Michener spoke on a recent article in "Bird Banding" on the banding of Herring Gulls with different colored bands, so that observers could tell from the color of the band where a bird was banded. He also told of the damage to electric power line poles by California Woodpeckers. Dr. Bishop told of seeing a male English Sparrow catching and feeding an insect to an adult male Black-headed Grosbeak.

Mr. James Fassero of Pasadena then showed several reels of motion pictures of young Bald Eagles in a nest on Catalina Island. Mr. Arthur Barr, of Pasadena, who assisted Mr. Fassero in taking the pictures, explained the pictures as they were run off and gave an interesting account of how the pictures were taken, and of the development and actions of the young birds. After the eagle pictures, two reels showing the development of a family of young Pacific Horned Owls were shown. The entire family of owls entered into the picture and their actions were most interesting. The female was very tame and would not leave the nest after the third visit; she allowed herself to be petted and moved about without showing any signs of being vicious. Usually these owls are very wild and sometimes are quite vicious, especially when there are young in the nest. Mr. Barr took one of the young owls when it left the nest and has raised it to maturity, keeping it in a cage with "Joe," another Horned Owl that he has kept for a number of years.

Adjourned.—Sidney B. Peyton, *Secretary.*

June.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum, Exposition Park, Los Angeles, on Tuesday, June 29, at 8 p.m. In the absence of both president and vice-president, Howard Robertson was asked to preside. The minutes of the Southern Division for May were read and approved. As there was no program for the evening, different members were called on to tell of anything interesting that they had observed. George Willett spoke on the recent bulletin of the Biological Survey on the speed of birds. Miss Fossler reported on the article on Falconry in the last issue of the National Geographic.

George Willett told of his trip over the previous week end on J. R. Pemberton's yacht out to the Cortez Banks, 100 miles off-shore, and of the birds observed on the trip. John McB. Robertson and Mr. Sheffler told of their recent trips to Buena Vista Lake and the lower part of the San Joaquin Valley. At the present time the lake is still rising and covers a large area, offering a fine feeding and nesting place for a large number of different kinds of water birds.

Adjourned.—Sidney B. Peyton, *Secretary.*

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